

**Sohio cuts operating costs 74%
with air fin coolers 29**

**UV analyzer saves \$5000/month
in petrochemical plant 87**

**... also more than 220 terse reports
on new processing techniques, chemicals,
instruments, equipment 6**

FEBRUARY 1959



CHEMICAL PROCESSING®

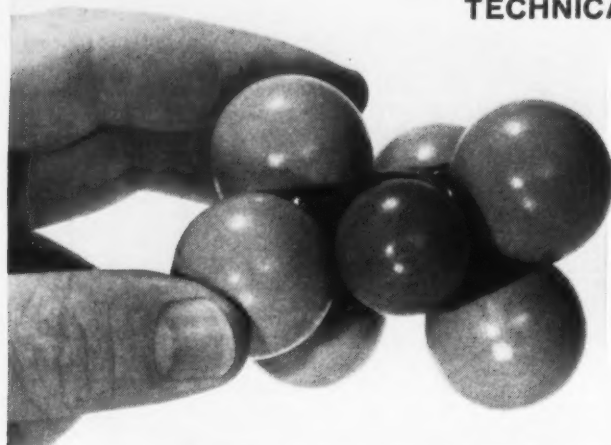
Shawinigan Resins thrives under 50-50 ownership . . . page 26

**Marketing director W. H. Bromley (left)
and vice president and general manager
W. Roy Elliot shape strategy to double
sales again in five years**



HEXACHLOROACETONE (CCl₃)₂CO

TECHNICAL, 97%



Hexachloroacetone is a strongly ketonic, non-flammable chemical intermediate and solvent. Structure and properties of its derivatives suggest their application as pharmaceuticals, herbicides, fungicides and insecticides. Derivatives include alcohols, amides, acids, acid chlorides and chlorofluoro compounds such as chlorofluoro-acetic acids, -acetic anhydrides, -acetyl chlorides, -acetamides, -acetones, and -ketone complexes.

Which of these interesting reactions interests you?

Hexachloroacetone reacts very slowly with water to yield trichloroacetic acid and chloroform.



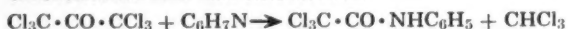
Hydrolyzes very rapidly with aqueous bases yielding sodium trichloroacetate and chloroform.



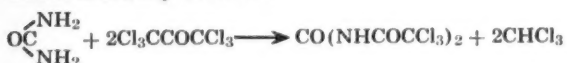
Amines and ammonia yield amides of trichloroacetate and chloroform.



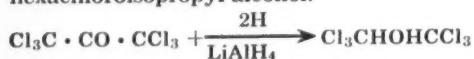
Hexachloroacetone reacted with aniline yields trichloroacetanilide and chloroform.



Heating of one molecular proportion of urea with two molecular proportions of hexachloroacetone, the amide is readily obtained.



Reduction with lithium aluminum hydride produces hexachloroisopropyl alcohol.



GENERAL CHEMICAL DIVISION
40 Rector Street, New York 6, N. Y.

Chlorinolysis of hexachloroacetone produces trichloroacetyl chloride and tetrachlorethylene or carbon tetrachloride and tetrachlorethylene.



Reaction with hydrogen fluoride in presence of a catalyst yields chlorofluoroacetones.



Like to experiment with HCA? Write us on business letterhead for experimental quantity. Hexachloroacetone is commercially available in 5 and 55 gallon drums, and in tank cars. Mail coupon for Product Information Data Sheet.

Baker & Adamson® Products
GENERAL CHEMICAL DIVISION
ALLIED CHEMICAL CORPORATION
40 Rector Street, New York 6, N. Y.

- ☐ Please send Product Information Data Sheet on Hexachloroacetone (DA-37501)
☐ Please send sample. Business letterhead is attached.

Name _____

Title _____

Company _____

Address _____

City _____ Zone _____ State _____



CP-2

conventions and exhibits

February 3-5. The Society of the Plastics Industry, Inc., 14th Reinforced Plastics Division Conference, Edgewater Beach Hotel, Chicago.

February 15-19. American Institute of Mining, Metallurgical, and Petroleum Engineers, Inc., Annual Meeting, San Francisco.

February 18-19. Chemical Market Research Association, meeting on textile chemicals, Dinkler Plaza Hotel, Atlanta, Georgia.

March 2. Louisville Federation of Paint & Varnish Production Clubs, Annual Symposium, Sheraton Hotel, Louisville, Ky.

March 2-6. Tenth Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, Penn-Sheraton Hotel, Pittsburgh.

March 3-5. Commercial Chemical Development Association, meeting, Statler Hotel, New York.

March 13. American Institute of Chemical Engineers and the American Chemical Society, Sixth Annual Joint Technical Meeting, Lamar State College of Technology, Beaumont, Texas.

March 16-20. American Institute of Chemical Engineers, National Meeting, Chalfonte Haddon Hall, Atlantic City.

March 16-20. Eleventh Western Metal Exposition and Congress, Pan-Pacific Auditorium and Ambassador Hotel, Los Angeles.

March 16-20. National Association of Corrosion Engineers, National Meeting, Sherman Hotel, Chicago.

March 17-18. Manufacturing Chemists' Association, Air and Water Pollution Abatement Conference, Netherlands Hilton Hotel, Cincinnati.

March 31-April 2. 21st Annual American Power Conference, sponsored by Illinois Institute of Technology, Hotel Sherman, Chicago.

... Meetings and shows of interest to the chemical industries

April 5-10. American Chemical Society, 135th National Meeting, Boston.

April 5-10. International Atomic Exposition, Public Auditorium, Cleveland.

April 20-22. The American Oil Chemists' Society, Spring Meeting, Roosevelt Hotel, New Orleans.

May 3-7. The Electrochemical Society, Inc., meeting, Sheraton Hotel, Philadelphia.

May 10-13. American Institute of Chemical Engineers, meeting, Kansas City, Mo.

May 14-23. International Petroleum Exposition, Tulsa, Oklahoma.

May 17. American Society for Testing Materials, Seventh Meeting on Mass Spectrometry, Statler Hilton Hotel, Los Angeles.

June 1-5. Fifth World Petroleum Congress Exposition, Coliseum, New York.

June 9-12. The Material Handling Institute's Exposition of 1959, Public Auditorium, Cleveland.

June 10-12. Instrument Society of America, Second International Symposium on Gas Chromatography, Kellogg Center for Continuing Education, East Lansing, Michigan.

September 13-18. American Chemical Society, National Meeting, Atlantic City.

September 21-25. 14th Annual Instrument-Automation Conference and Exhibit, International Amphitheatre Chicago.

September 27-30. American Institute of Chemical Engineers, meeting, St. Paul, Minnesota.

September 28-30. American Oil Chemists' Society, meeting, Hotel Statler, Los Angeles.

October 18-22. The Electrochemical Society, Inc., meeting, Deshler-Hilton Hotel, Columbus, Ohio.

flowing air moves bulk materials better

AUTOMATIC PRODUCTION STARTS HERE:

This compact Airstream Conveyor installation is at Easton (Md.) feed mill of J. McKenny Willis & Son, Inc. Self-cleaning system unloads 25 tons per hour of soft meals for animal feed without dust, waste or mixing of meals. Vertical movement requires no more power than horizontal flow.

Efficient bulk materials handling is a major factor in any modern plant. Outmoded handling methods put a costly kink in production processes which are otherwise smooth and automatic.

A Dracco Airstream Conveyor can provide air-smooth bulk handling to supplement your other up-to-date operations. Airstream systems are readily adaptable to control and any degree of automation is possible. Versatile intake devices permit unmatched mobility in unloading areas. One-man supervision, with flow regulated from a central control panel, replaces costly manual handling.

Airstream Conveyors are enclosed and self-cleaning, permitting movement of different materials in quick succession without dust, waste or intermixing. Conveying lines require little space, conform easily to existing plant layouts, can be installed out-of-the-way without expensive structural supports.

For more information on how flowing air can move your bulk materials better and cut handling costs, call or write:

DRACCO DIVISION OF FULLER CO.
4070 East 116th Street • Cleveland 5, Ohio

New 32-page brochure presents detailed information on how Dracco Airstream Conveyors have solved bulk materials handling problems. Write for Bulletin 530.

DRACCO airstream conveyors
dust control equipment

Check 3539 opposite last page

THE ALL NEW SUB-X INERT GAS GENERATOR

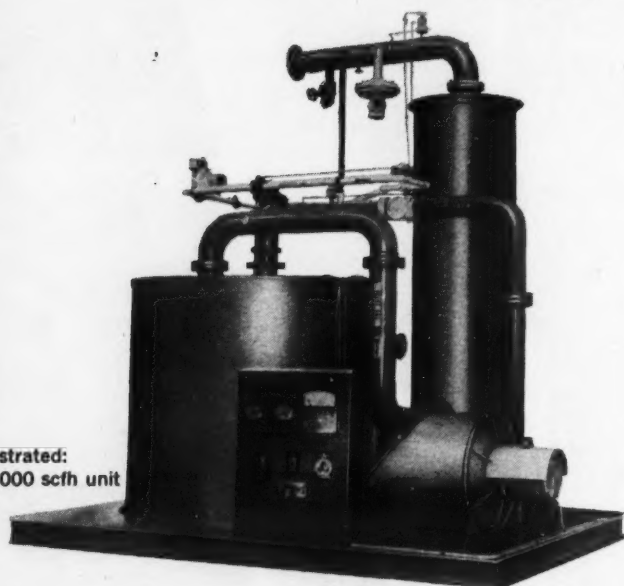
utilizes unique principles of design to provide refineries, chemical processors, metallurgical plants and other industrial users with a source of inert or purge gases that is compact in size . . . highly efficient . . . extremely economical to operate.

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makes feasible the use of low-cost river or contaminated water as coolant. The tank of water through which the gases pass provides an unusual degree of safety to prevent flash-back between the burner and the process.

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and maintenance costs reduced through the use of the high heat release THERMAL burner which can be fired with either gas or distillate oil. Units are supplied as complete packages and include all control and safety equipment. Standard models will produce up to 60,000 SCFH of inert gas; larger capacity units can be designed to meet your specifications.



Illustrated:
50,000 scfh unit

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WRITE FOR BULLETIN #114

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- Air Heaters
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- Combustion & Heat Transfer Equipment

CHEMICAL PROCESSING

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CHEMICAL PROCESSING PREVIEW
and Chemical Business

For the management team

More than 50,000 copies of this issue

Vol. 22

February 1959

No. 2

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CHEMICAL PROCESSING serves members of the Management Team in these industries:

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OTHER SUBSCRIPTIONS — from "non-qualified" persons (those who are not key processing men in the chemical industries) — are accepted at \$1.00 the copy, or \$10.00 the year. Foreign subscriptions — subscriptions from countries outside the territory of the United States and its possessions are acceptable at \$35.00 per year. Such subscriptions are not counted as "industry circulation" on BPA audit reports.

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Check 3540 opposite last page



over the editor's
shoulder



Too hot to handle?

All the clams aren't at the bottom of the ocean.

For reasons which may or may not be obvious, we've encountered some leaders in various branches of industry who have "clammed up" when asked by CHEMICAL PROCESSING:

"What are your views on importing aromatics from Iron Curtain countries?"

Is this subject too hot to handle?

We wonder when we get replies such as these:

"Under the circumstances . . . we must decline your invitation to offer further opinion," or

"For certain policy reasons, the company does not wish to comment," or

" . . . We feel it wise to skip this one."

Another reply, notable for its brevity, said:

"Sorry, no comment."

There has been quite a hurrah created over these Iron Curtain aromatics. Yet, we don't feel readers have been given a provocative analysis of the situation such as will be found on page 25.

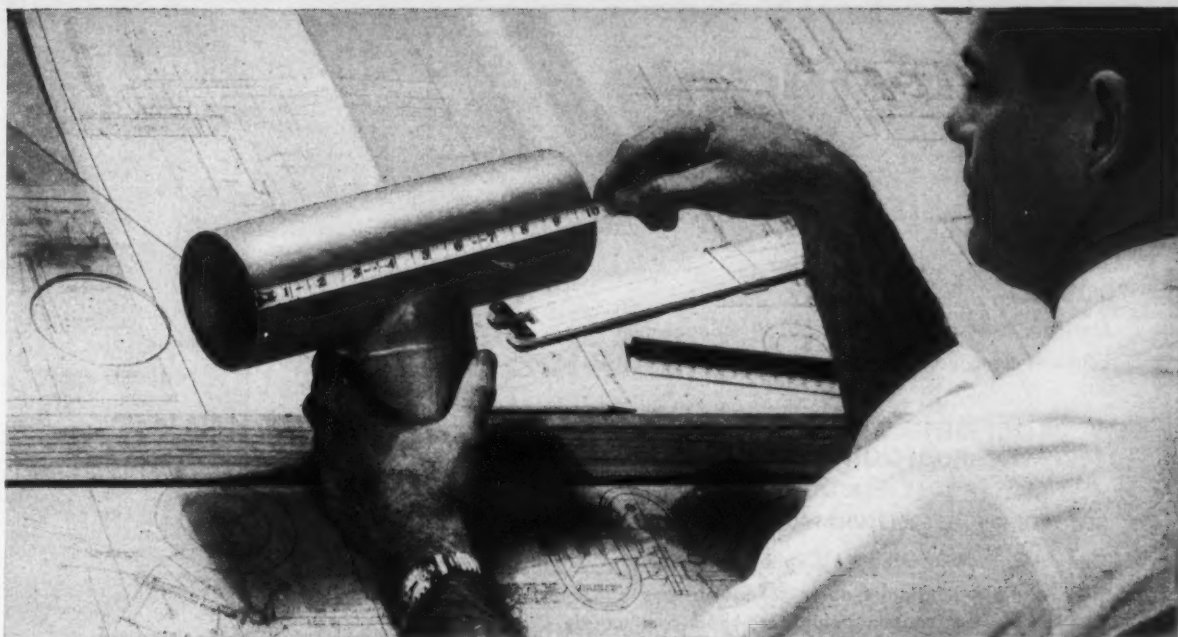
While there is reluctance in some quarters to give this subject a good old-fashioned airing, we have something right in our front yard we would like to talk about.

We are pleased to tell you that we have moved to greatly expanded CP editorial offices at 111 East Delaware Pl. in Chicago. It's just further proof of how we are growing with the growing chemical processing field.

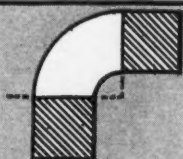
Next time you are in Chicago, won't you drop in for a visit. We sure would like to see you.

Paul Hoffman

News Editor



SAVINGS ARE MEASURABLE...START TO FINISH WITH LONGER LENGTH SPEEDLINE FITTINGS



HERE'S HOW YOU CAN CUT PIPING COSTS

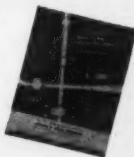
A conventional 90° elbow is shown inside the dotted line. The shaded areas indicate the extra length you get with a Speedline fitting—at no extra cost. For example, on a 3" Speedline Elbow it means 4" more pipe. Thanks to the longer length of all Speedline fittings, all types of joints are made more easily . . . cost less . . . than with conventional fittings. Make your own comparisons.

For location of Authorized Distributor nearest you, see Speedline listing on page 593 in Chemical Engineering Catalog.

With this 3" Speedline Tee you get 3 1/4" "more length" at no extra cost. Speedline's *tangential feature* cuts costs and design detailing, too . . . lets you select the best joint to meet assembly requirements . . . means more clearance for welding and easier pipe aligning. Flange where you want to, weld where you want to . . . any type joint can be used on *any* or *all* ends of a Speedline corrosion resistant fitting!

Greater flexibility of Speedline long length fittings adds up to faster assembly and *lower installed costs*—even for the most complex process piping system. And, of course, Speedline corrosion resistant fittings *cut material costs two ways*: they give *more* pipe length per fitting and they facilitate use of economical *light wall* stainless steel pipe.

Before you plan any new installation or system addition, investigate the many advantages of Speedline's *tangential* feature. Write for Speedline Catalog showing how you save with the complete line of Speedline fittings.

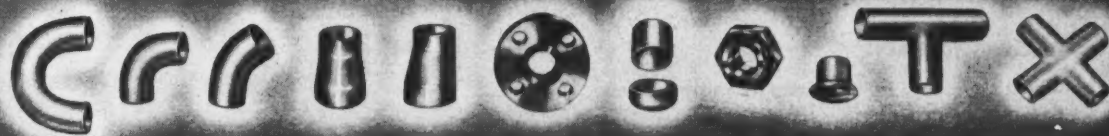


Speedline

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STAINLESS STEEL FITTINGS

SPECIALY DESIGNED FOR SCHEDULES 5 AND 10 PIPE



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Check 3541 opposite last page

highlights

**CHEMICAL
PROCESSING**

FEBRUARY 1959

VOLUME 22 • NUMBER 2

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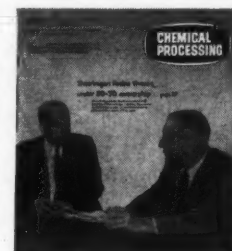
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THIS MONTH'S COVER

Having dual "parents" has proved successful for Shawinigan Resins Corp., owned 50-50 by two leading chemical companies. Rate of growth and profit picture have shown consistent upswing since firm was organized in 1937. The two men on the cover are discussing plans to double sales again in five years. Company concentrates in narrow field—vinyl resins and vinyl acetate derivatives. It manufactures and sells 54 of them. (See "Chemical Business Profile," page 26.)



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SPECIAL READER SERVICES

• For more information on articles and advertisements in this issue, check the Reader Service slip opposite last page

• To subscribe to this magazine, see reader-qualification form opposite last page



letters from readers

Caught with your constants down?

Class is now in session for another lesson in uncommon constants.

If you thought Chaldron Ell Slug had some dandies, wait until you get a load of the dillies contained in this letter just received:

Dear Editor:

Chaldron Ell Slug's letter in your December issue (page 10) brings forth another use for uncommon constants. Although we have not instituted a "Variable Constant System" as he suggests, for the past 2½ years we have been sporadically engaged in developing the use of constants expressed in novel units, as the enclosed Newsletter will show.

Excerpted from Newsletter):

Constant	Unit
Speed of light	1.8 x 10 ¹² furlongs/fortnight
Density of water at 3.98° C	3157 scruples/firkin 63141.35 scruples/kilderkin

We find two main uses for such constants: 1) They are a great aid in maintaining security on classified projects, and 2) they are a great aid in small talk at meetings and conferences, especially management meetings.

WM. H. FISCHER
Chemical Engineering

CHARLES J. GUARE
Analytical and Physical
Chemistry

General Engineering
Laboratory

General Electric Company
Schenectady 5, N. Y.

(Editor's Note: And all the time we thought scruples were what people had none of!)

Do You Have Any Constants?

Can you top these uncommon constants or those suggested by Chaldron Ell Slug? If you have any, send them to the editor. If no one else can use them, don't fret. Your efforts aren't in vain. At least one member of the staff is getting a liberal education.



Your Solid-Liquid Separators belong in this picture

These Bird Continuous Solid-Bowl Centrifugal installations, and hundreds like them, cover everything from aluminum hydrate to zinc sulphide, from coal to cryolite, from ultramarine pigment to uranium.

All have one thing in common. They make highly effective use of positive, powerful centrifugal force to do the separating job.

All we ask is the chance to determine (by pilot-scale test of the actual slurry at the Bird Research and Development Center, if need be) whether *your* solid-liquid separations can be accomplished *better, faster and at lower cost* by this modern method.

Isn't this something you'd like to know? If so, just get in touch with us.

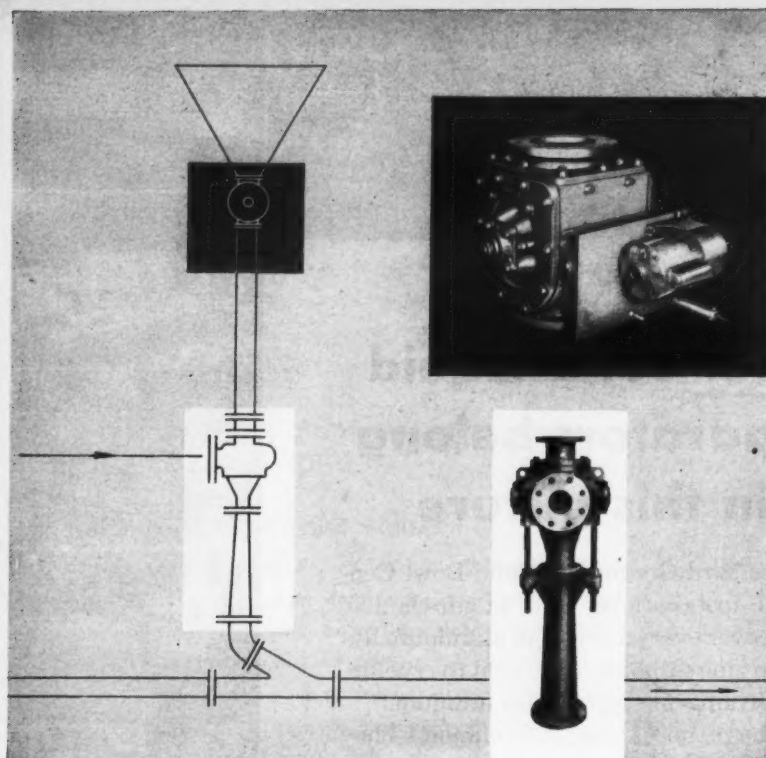
BIRD

LEADING AUTHORITY ON
SOLID-LIQUID SEPARATIONS

- Bird Continuous Centrifugal Separators
- Bird-Prayon Continuous, Rotary, Horizontal Vacuum Filters
- Bird-Young Single Cell Rotary Vacuum Filters
- Bird Horizontal Tank, Vertical Leaf Pressure Filters
- Bird-Humboldt Screen Type Oscillating Centrifuges
- Bird Suspended Centrifugals • Bird Centrifugal Classifiers
- Bird Continuous Centrifugal Solid Bed Filters • Bird Rotachurns

For specific information on individual machines write:
BIRD MACHINE COMPANY
South Walpole, Mass.
Regional Offices:
Evanston, Illinois
Walnut Creek, California
Atlanta 9, Georgia

Check 3542 opposite last page



MIXING IN TRANSIT

Here is a practical solution to a chemical materials handling and mixing problem—worked out with A-S-H equipment for the process industries.

The problem was to transport two chemicals—a dry, granular solid and a liquid—to a tank. By feeding the solid through an A-S-H Rotary Feeder and mixing with an A-S-H Low Pressure Hydrovactor, the process engineer was able to *mix in transit*.

The benefits of this installation include:

- elimination of mixing equipment
- easy, low cost installation
- comparative freedom from maintenance
- positive feed and thorough mixing



Like to know more? Write for Data Sheets DVC and Ed today. Or give us your problem and let our engineers tackle it. We have more than 36 years of success in solving the difficult materials handling problems.

the **Allen-Sherman-Hoff** company
257 E. Lancaster Ave., Wynnewood, Pa.
Offices and representatives in principal cities
MATERIALS HANDLING EQUIPMENT

Check 3543 opposite last page

LETTERS

Kudos for Lichtgarn

Dear Mr. Lichtgarn:

Your article, "Understanding of The True Nature of Creativity and Inventiveness" (December CP, page 32), is all truth and fact. I commend your attempt to open the eyes of those who control the "well oiled mechanism," but I doubt whether they can see the forest for the trees.

Your article is well written, easily understood, shows a high degree of intelligence, etc. — tops in short. I would like to see more of them.

EDGAR A. DIEMAN
Crown Point, Ind.

YOUR OPINIONS —

— and comments on the significant subjects carried in each month's **CHEMICAL PROCESSING** are important! We welcome your letters expressing your views. Many CP readers are taking the opportunity to state their views on today's top questions.

By publishing your letters in **CHEMICAL PROCESSING** others will have the opportunity to hear your side.

Perhaps you agree

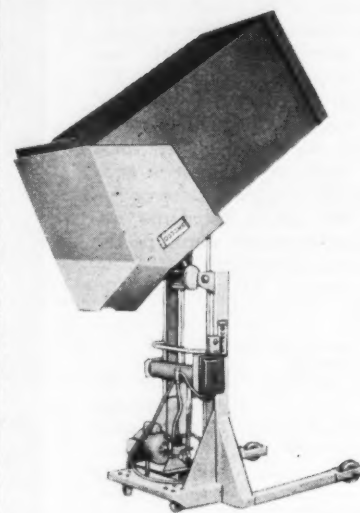
With what has been written in these articles.

Maybe you don't.

You might even have a thought or angle which wasn't expressed. If so, why not let us and others hear your ideas? Suitable letters will be published in these regular "Letters from Readers" columns. Address your comments to:

The Editor
CHEMICAL PROCESSING
111 E. Delaware Place
Chicago 11, Illinois

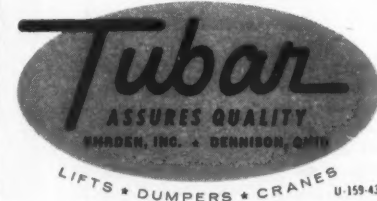
Now... a Powerful New TUBAR DUMPER Specially Designed for Bulk Chemical Containers



The new Tubar Twin-Cylinder Dumper is designed for all-purpose service in paint plants . . . pharmaceutical houses . . . granular plastics . . . and everywhere bulk chemicals are handled. It's built for years of rugged, heavy-duty service . . . cuts chemical container handling costs to the bone. Write for full information and operating specifications.

- Most models can be made portable
- Stops and holds loads at any point in dumping cycle
- Optional splash-proof and explosion-proof power features

UHRDEN is serving industry with a full line of all-purpose and special-purpose dumpers. Standard production models . . . or built to your specifications.



Check 3544 opposite last page
CHEMICAL PROCESSING



Watching Washington

Additives, Labeling, Cosmetics Due for Congressional Action

As the 86th Congress gets down to business, chemical processors should watch for possible legislation in three areas of interest: color additives, precautionary labeling, and cosmetics.

Color made news recently when the Supreme Court ruled out Red 32 used to color oranges (see September 1958 "Watching Washington"). The high court had in its hands two conflicting decisions on interpretation of the Food, Drug, and Cosmetic Act of 1938 with regard to coal-tar colors. Under the law, coal-tar colors must be from certified batches—and FDA can certify a color only if it is "harmless and suitable for use."

FDA interprets the law to mean "harmless per se," that is, the law does not allow FDA to place a limit on how much coal-tar color may be used or to say that it can be used in one food and not in another. If FDA finds a color harmless, it lists it for use without limitation. If the color is found to be harmful in some concentrations, it declines to list it at all.

This interpretation was challenged by the 5th Circuit Court in New Orleans, which ruled in favor of the Florida Citrus Exchange and others contesting the government's ban on Red 32.

This court interpreted the law to mean that the Secretary of Health, Education, and Welfare had the authority to certify colors as safe if they are harmless in the amount normally used. This, in effect, meant that Red 32 would have to be kept on the list.

Conflicting Ruling

But the ruling conflicted with the 2nd Circuit Court in New York, which upheld the "harmless per se" theory and the secretary's action in removing Orange No. 1, Orange No. 2, and Red 32 from a list of approved harmless colors for use in foods.

The Supreme Court ruled unanimously in favor of the government, stating:

"Where a coal-tar color is not harmless, it is not to be certified (as safe); if it is not certified, it is not to be used at all."

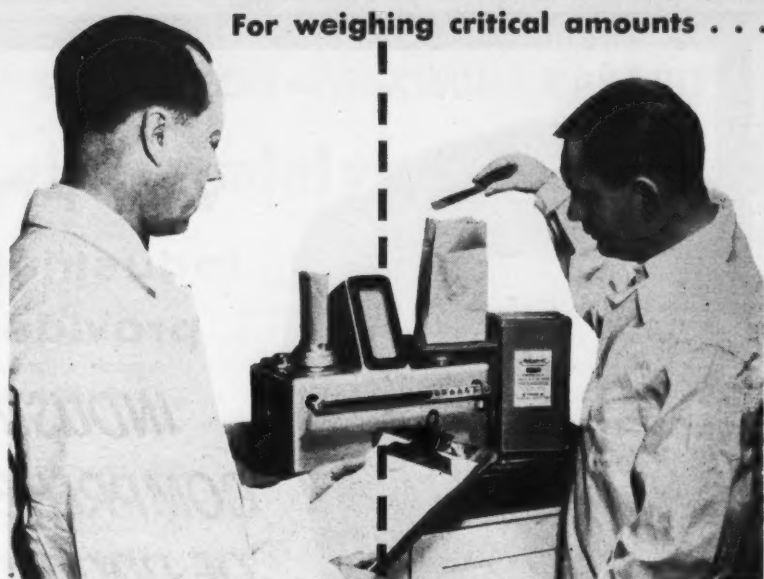
According to Justice William J. Brennan, author of the opinion, the HEW secretary's order banning Red 32 was lawful, and orange growers "present no grounds on which they can legally object to its application to them."

Despite the ruling, FDA isn't happy with the law, and has called for a "legislative re-evaluation of the national policy with respect to colors."

What FDA Likes

Here are some of the essential features FDA would like to see in a color-additive bill:

1. It should apply to any color additive, not just "coal-tar colors."
2. There should be no blanket "grandfather clause."
3. Before a color additive may be marketed for use in food (or drugs or cosmetics), its suitability for such use should be established and it should be placed on a permitted list by the government.
4. Where necessary, purity and suitability of individual batches of permitted colors should be certified by the government before marketing, as coal-tar colors are now certified. Where certification is not necessary, FDA should have the authority to exempt a



For weighing critical amounts . . .

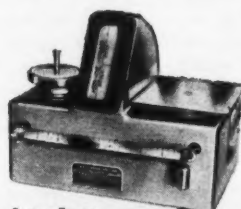
Accurate readings are easier faster with SHADOGRAPH®

Shadograph balances, designed for fast, accurate production weighing operations as well as for laboratory use, offer weight indication you can read at a glance. Ultra-visible readings are made possible by sharp, shadow-edge indication on an illuminated dial. Friction is eliminated from indication system; balance comes to rest more quickly. Parallax readings are impossible.

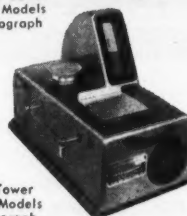
Shadograph, a precision product of Exact Weight Scale Company, is backed by more than 40 years of experience in industrial weighing equipment. Write for Bulletin 3333.

35 BASIC MODELS

Shadograph models are available with capacities from 2000 milligrams to 100 pounds for use in compounding, check-weighing and for many types of laboratory purposes. Dial and beam graduated in avoirdupois or metric, as specified. Shadograph is available with photocell controls for operating visual and audible signals or for control of auxiliary machines and equipment.



Center Tower
4200 Models
Shadograph



End Tower
4100 Models
Shadograph

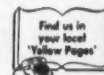
See Chemical Engineering Catalog pages 316-317 for more information on Exact Weight scales.



THE EXACT WEIGHT SCALE CO.

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Sales and Service Coast to Coast



BETTER QUALITY CONTROL . . . BETTER COST CONTROL

Check 3545 opposite last page



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COMPREHENSIVE FAMILY
OF PROTECTIVE COATINGS***

TARSET®

The exclusive and patented coal tar-epoxy resin coating that has revolutionized the control of severe corrosion. Tarset provides excellent protection against petroleum crudes, hydrogen sulfide, brines, gasoline and many other corrosive agents.

TARMASTIC®

A broad line of time-tested coal tar coatings (formerly "100 Series" Coatings) which provide excellent corrosion protection on metal, masonry, and concrete surfaces—above and below ground. There's a Tarmastic formulation to control virtually any corrosion condition in your plant.

Insul-Mastic®

A series of vaporseal, condensation control and insulation coatings. Special Gilsonite asphalt formulation makes Insul-Mastic coatings highly resistant to acids and alkalis, as well as to moisture penetration.

There's a real advantage, in economy and convenience, when you buy *all* of your heavy duty *cold applied* protective coatings from one source—your Pitt Chem Industrial Distributor. Another important Pitt Chem *plus* is the ready availability of experienced technical help, wherever and whenever you need it. For more information about your coating problems, contact your Pitt Chem Coatings Distributor today!



WSW-7393

COAL CHEMICALS • PROTECTIVE COATINGS • PLASTICIZERS • ACTIVATED CARBON • COKE • CEMENT • PIG IRON • FERROMANGANESE

Check 3546 opposite last page

WASHINGTON NEWS

color from certification requirements.

5. The bill should forbid listing of a color for a use which will "promote deception of the consumer."

Everyone is agreed that without new legislation there is a prospect of gradual removal of colors from the permitted list. There is no indication that adequate substitutes will be developed which are suitable for acceptance on the list.

The certified color industry has redrafted proposed legislation taking into consideration FDA's suggestions. There is hope that one bill, suitable to all, will emerge.

Labeling Bills

During the last session of Congress, federal hazardous substances labeling bills were introduced, but no hearings were held. The Manufacturing Chemists' Association and the American Medical Association drafted differing bills.

An MCA spokesman reported at a recent industry-HEW meeting that several interested trade associations, as well as the AMA are working with each other with a view to coming up with one bill supportable by all. If no agree-



"It's just a short note from our man at Cape Canaveral."

ment is reached on a single piece of legislation, separate bills will be proposed.

FDA's position on labeling legislation is that a modern law is called for in light of technological developments of the past three decades. The agency is still operating under the Federal Caustic Poison Act of 1927.

As yet, though, FDA has not taken a position on proposed legislation. Commissioner Larrick has asked for recommendations from groups involved so FDA can study the issues.

Undue Burden Cited

A good, workable federal bill would result in standardization of labeling requirements throughout the country. Without a federal law, possibility exists that state or local laws would place an undue burden on manufacturers of nationally distributed products.

Right now, New York City has moved along on its own and is preparing a set of new and stricter regulations governing labeling of household as well as industrial compounds.

This "hazardous chemical labeling law" replaces present sections of the Sanitary Code requiring a manufacturer to label products with appropriate warnings. It will be up to the Department of Health to determine what products are poisonous or hazardous, and what warnings and label declarations must be made.

Cosmetics Testing Law

There's a good chance that legislation to require safety testing of cosmetics before marketing will be introduced soon. While government has not taken a position with respect to any individual bill, FDA has made the following statement with regard to possible legislation:

"It is reasonable to believe that eventually pre-testing of cosmetic ingredients and finished formulations will be required with adequate provisions for appeal from adverse government decisions."

IN PRESSURE OR VACUUM DISTILLATION METAL PALL RINGS PROVIDE MAXIMUM SEPARATION—MAXIMUM CAPACITY

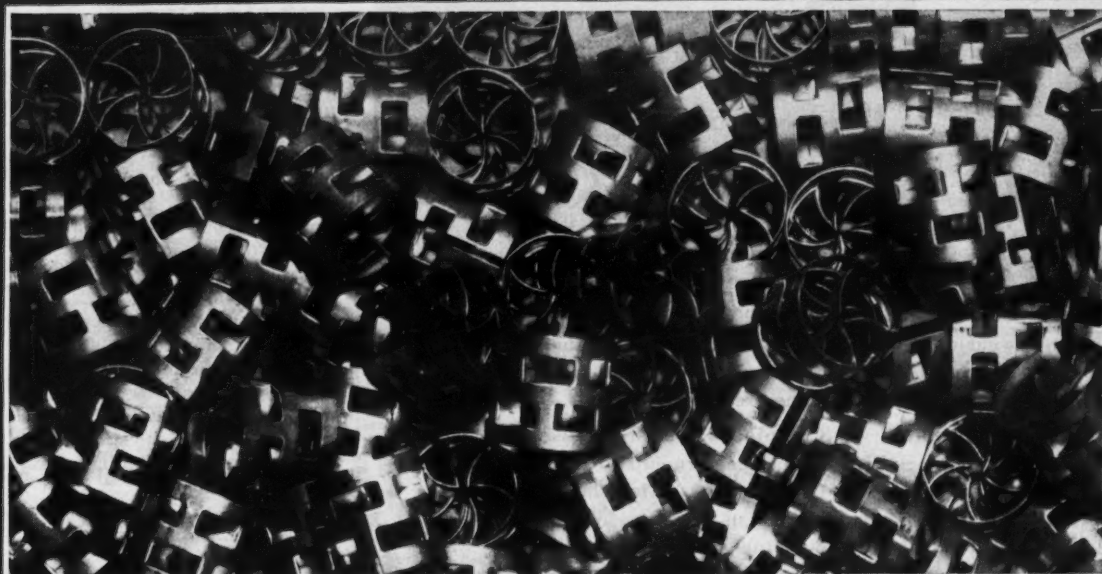
... with a minimum size shell

The superiority of metal Pall Rings is nowhere more clearly established than in distillation operations. Here two characteristic advantages of the Pall Ring come into play: (1) extremely low pressure drop, and (2) exceptional internal distribution at the low liquid rates employed in distillation.

In bubble cap towers or distillation columns packed with raschig rings the higher pressure drops necessitate higher pressures and higher boiler temperatures. Not infrequently the temperature required is so high as to invite product break down.

Not only can lower pressures and lower boiler temperatures be employed when the column is packed with metal Pall Rings but the fractionating efficiency of the column can be improved as much as 25% to 40%. In new construction the higher efficiency of the metal Pall Ring permits substantially smaller shells to be employed.

Metal Pall Rings are now being made in the ¾", 1", 1½" and 2" sizes from carbon steel, the 18-8 series of stainless steels, monel, inconel, titanium, aluminum and copper.



The metal Pall Ring is similar to the raschig ring in that height and diameter are equal. In the raschig ring the interior wall is mostly inactive providing little or no active contact between phases. In the metal Pall Ring, sections of the wall are stamped and bent inward, thus making the inner wall an active, working surface. Pressure drop is less than half that of raschig rings, resulting in a much greater capacity per unit of tower area.

Write today for engineering data on metal Pall Rings.

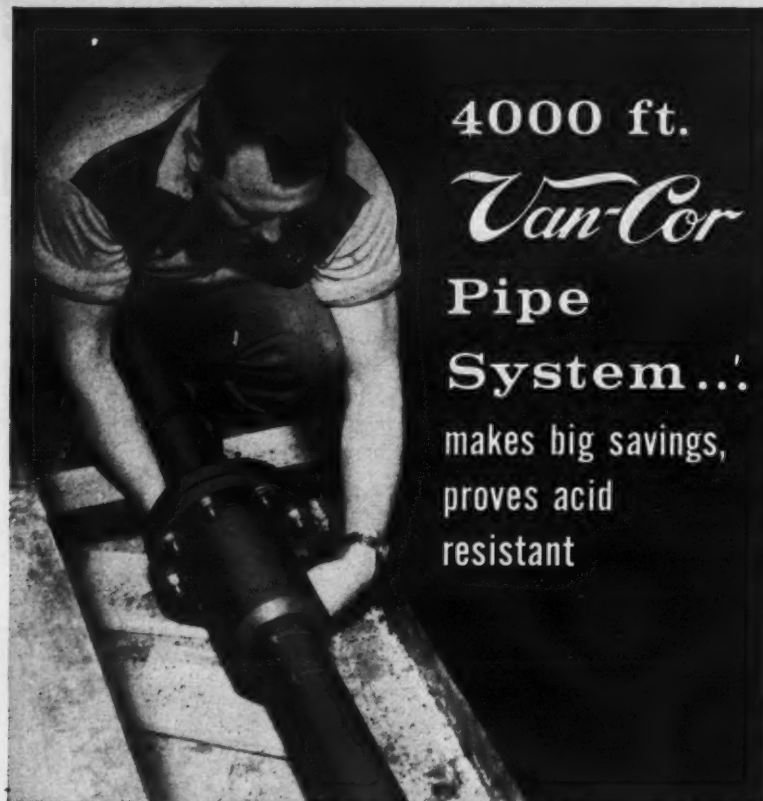


U. S. STONEWARE

AKRON 9, OHIO

224-F

Check 3547 opposite last page



4000 ft.
Van-Cor
Pipe
System...
makes big savings,
proves acid
resistant

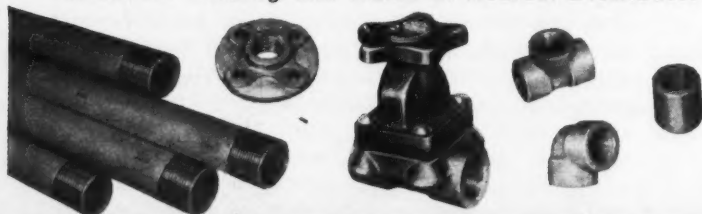
At the Allentown (Pa.) Works of the Western Electric Co., the entire waste acid disposal system in the recent addition consists of Van-Cor rigid PVC pipe and fittings.

HOW COSTS WERE CUT. Initial price of Van-Cor was $\frac{1}{2}$ that of comparable cast iron alloy pipe. On a 6" line, labor costs were estimated at 29¢ per foot of run—about half that of metallic pipe. Also, because Van-Cor has only $\frac{1}{10}$ the weight, no mechanized handling equipment was needed. Available in 10 or 20 ft. lengths, Van-Cor requires fewer joints, and eliminates the breakage problem.

CORROSION LICKED. Van-Cor pipe was used because "corrosion resistant" cast metallic pipe had performed short of expectations in an adjacent building. After 1½ years service, the Van-Cor system is in excellent shape, unaffected by such acids as hydrofluoric, hydrochloric, sulphuric, nitric and many plating solutions.

Investigate Van-Cor Pipe, Fittings, Valves, Electrical Conduit, and Fabrications...

Write for Catalog and Name of Nearest Distributor



INDUSTRIAL DIVISION OF
COLONIAL PLASTICS MFG. CO.
Subsidiary of THE VAN DORN IRON WORKS CO.
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Check 3548 opposite last page

WASHINGTON NEWS

Small business group to aid R & D programs

Good news for small chemical processors comes from the Small Business Administration, which has set up a new division to assist small firms in the formation of joint research and development programs and provide technical counsel and aid in locating and developing facilities for conducting research.

Under authorization of the Small Business Act of 1958, the new division also will try to pry more R & D work for small firms out of the Department of Defense.

Food additives session published in journal

Proceedings of the two-day FDA-Food Law Institute meeting on the new food additives amendment are available from the "Food, Drug, and Cosmetic Law Journal." The meeting, jointly sponsored by the two groups, was held recently to "acquaint all concerned with the new law and its requirements."

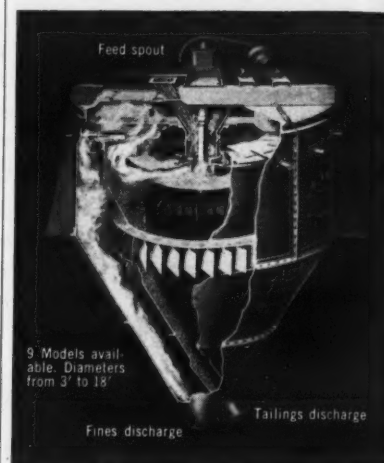
Approximately 550 persons attended. Some 200-plus questions were directed by industry representatives to FDA administrative officers and scientists. These questions and answers also are published in the proceedings.

AEC plans more studies of reactor concepts

Proposals for studies of three new reactor concepts have been selected as bases for contract negotiations by AEC. Proposals were submitted by American Radiator & Standard Sanitary Corporation for a study of a mercury-cooled, fast breeder reactor; General Electric Company for a study of a modified sodium graphite reactor with modules containing fuel and coolant; and Babcock & Wilcox Company for a study of a gas suspension coolant reactor.

Size Requirements Getting Tougher?

**Sturtevant Air Separators
Increase 40 to 400 Mesh
Output as Much as 300%**



Closed-circuit air separation is of proved advantage in reduction processes. Result is a better, more uniform product. Grinding mills perform at top efficiency, output frequently increases as much as 300%, power costs drop as much as 50%.

Precise separation of all dry powdered materials. Sturtevant's currently classify sulfur, soybeans, phosphate, chocolate, feldspar, sand and aggregates, pigments, limestone fillers, flour, abrasives, plastics, gypsum, ceramics, cement and other products.

Improve screening — Sturtevant Air Separators prevent blinding by removing undesirable tailings or fines from screen feed loads.

Works Like Winnowing Done in a Whirlwind

Sturtevant Air Separators do a mechanical job of winnowing. Precise control of whirlwind air currents and centrifugal force results in the desired size being lifted into fines cone, oversize falling into tailings cone.

A 16 ft. Sturtevant, for example, has taken a feed rate of 800 tph, containing only a small percentage of desired fines, and delivered 30 tph 90% 200 mesh, recirculating the oversize through the grinding circuit.

Send for Bulletin No. 087.

STURTEVANT
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119 Clayton St., Boston, Mass.

Crushers • Grinders • Micron-Grinders • Separators
Blenders • Granulators • Conveyors • Elevators

Check 3549 opposite last page

CHEMICAL PROCESSING

Borden Building Two Plants; Opens PVC Addition

Units at Leominster and Illiopolis
to cost total of \$2 million

Borden Chemical Company has announced construction is under way on two new plants to cost a total of \$2 million, almost simultaneously with dedication of a \$4-million addition to another plant.

A polyvinyl alcohol plant designed to produce 5 million lb per year is being erected adjoining the company's present PVA facility at Leominster, Mass.

Bearing a price tag of \$1.5 million, the plant is scheduled to go on stream in October. A new continuous process, developed and engineered by Borden technicians, will be used in the plant.

Work is moving along at Illiopolis, Ill., on a coatings and adhesives manufacturing plant that is expected to be in production by July 1. The \$500,000 unit will serve the packaging, building, plastics, coatings, and adhesives industries in Chicago, St. Louis, Detroit, Kansas City, and other Midwestern cities.

The \$4-million addition to the polyvinyl chloride facility at Leominster has increased Borden's production capacity of this compound from 12 million lb to 38 million lb a year.

In addition to the manufacturing facilities, the company also has enlarged its development laboratories. This expansion, completed at a cost of approximately \$500,000, not only doubled the size of the former laboratory but also called for a 100% increase in technical personnel.

Jefferson Chemical Company, Inc., has placed on stream at Port Neches, Texas, a new ethylene plant, first of several units to be completed as part of a major expansion program.

Completion of a direct oxidation plant to produce ethylene oxide was slated for last month. Scheduled for completion before mid-summer are a chlorine-caustic unit, an ethylene glycol plant, and units for production of propylene glycol and propyl-

ene oxide. All of these units also are at Port Neches.

Besides production facilities, other major items in the expansion program—begun in late 1956—included a new administration building, two large boilers, and deep-water dock facilities on the nearby Neches River.

The new ethylene plant will triple the company's production of this chemical. When over-all expansion is completed, plant's capacity for ethylene glycol will be doubled, and production of ethylene oxide will be increased by 50%.

Fiber Industries, Inc., jointly owned by Celanese Corporation of America and Imperial Chemical Industries Limited, of Great Britain, will build a new plant on a 215-acre site near Shelby, N. C., for production of Teron polyester fiber.

Construction on the plant's first unit was scheduled to begin by January 1. The facility will have an eventual capacity of 40 million lb per year, and will be brought into production by stages.

Teron will be produced in both filament yarn and staple fiber form for major end uses in apparel and home furnishings. When the plant is in production, it will mark the first U. S. effort to manufacture and market competitively a commercially established polyester fiber of the same chemical composition as Dacron (polyethylene terephthalate).

American Cyanamid Company is building a small scale

Revolutionary new
shipper for
liquids and
dry materials!

CUBECON!

**Combines wirebound, corrugated carton
and polyethylene liner**

SAVES!

- ✓ Cost of Containers!
- ✓ Costly Shipping Space!
- ✓ Valuable Storage Space!
- ✓ Container Weight!

Now...save on costly drums and packing time by using MAXWELL'S CUBECON...a revolutionary new conception in lightweight, versatile, low-cost shipping containers. Purity guaranteed by perfectly scaled polyethylene liner; lightness and strength provided by the corrugated carton, tongue and groove cleats in the wirebound outer container strengthen CUBECON for stacking and shipping.

Our company has a multi-plant operation and 45 years' experience in the manufacture of corrugated, wirebound and plywood shipping containers. We can serve your needs and save you money!

Let us quote Cubecon on your requirements

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PLANTS: Chicago, Illinois • Albany and Macon, Georgia • Jasper, Florida

Check 3550 opposite last page

FLETCHER **TORNADO-MATIC**

**THE ONLY CENTRIFUGAL
THAT CAN CUT COSTS
LIKE THIS—**



**COMPLETELY
AUTOMATIC**

FOR EXAMPLE:

this one 48" x 30" Tornado-Matic
does the work of two conven-
tional 40" centrifugals →

PROVIDES 5-WAY SAVINGS

100%	labor costs
50%	installation costs
50%	space requirements
75%	power to operate
25%	initial outlay

The new fully automatic Fletcher Tornado-Matic gives you round-the-clock production. Needs no operators. Assures absolute quality control of your product because of uniform production cycles. See page 708 in Chemical Engineering Catalog.

Fletcher Tornado-Matic unloader gives you these extra *exclusive* features.

- **Contamination-Free** . . . No lubricants to leak or seep on product. No teeth on which product can catch.
- **Flexible Operation** . . . Fully adjustable as to pressure and speed.
- **Power Packed** Smooth unloading of difficult products.

Also available in manual and semi-automatic models
F/M variable speed drive zero to maximum RPM

ASK ABOUT THE FLETCHER RENTAL PLAN

**The New Fletcher Works, Inc. CENTRIFUGAL
DIVISION**

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Send me additional information on the Fletcher Tornado Centrifugal

NAME & TITLE

ADDRESS

COMPANY

CITY & STATE

Check 3551 opposite last page

CHEMICAL BUSINESS

special production plant adjacent to its new Creslan acrylic fiber plant in Santa Rosa county, near Pensacola, Florida.

Scheduled for completion in fall, the new plant will occupy about 24,000 sq ft of floor space. It will be equipped with advanced processing machinery.

The prototype unit will permit continuing improvements in processes and products, serve as a trial area for new equipment and techniques, and speed production of custom lots of fiber. Small lots of fiber, needed by mills and other processors to prove out laboratory findings, will be produced and delivered without disruption of main plant operations.

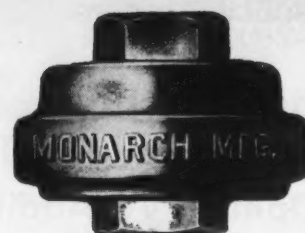
Mobay Chemical Company's plant at New Martinsville, W. Va., has had manufacturing capacity for tolylene diisocyanate chemicals increased 50% with opening of a new addition.

Pittsburgh Coke and Chemical Company has placed on stream a new plant for production of fumaric acid. By using integrated materials from its phthalic anhydride operation, the company is said to be the second one in U. S. to produce this chemical from its own basic raw materials.

Chemetron Corporation has completed acquisition of Cardox Corporation's carbon dioxide, chlorine dioxide, and fire equipment divisions. With the acquisition, carbon dioxide activities of Chemetron's National Cylinder Gas Division will be combined to form a new division called the Cardox Division of Chemetron.

Union Carbide Chemicals Company, division of Union Carbide Corporation, has completed the first commercial unit for production of Polyox water-soluble resins. Located at the company's South Charleston, W. Va., plant, the new unit has a capacity of more than one million lb a year.

At the same time, the company announced a sharp reduction in truckload quantities of its three commercial grades of Polyox resins, designated WSR-35, WSR-205, and WSR-301.



SCRUBBING CORROSIVE GASES?

Are your scrubbing nozzles as efficient as you think they could be? Do they resist corrosion or wear conditions satisfactorily—produce the breakup and distribution you would like?

Outline your spray problems for us. If your liquid can be sprayed with direct pressure—Monarch can furnish the nozzles.

NOZZLES FOR:

- OIL ATOMIZING
- HUMIDIFYING
- AIR WASHING
- DESUPERHEATING
- SPRAY PONDS
- MILK POWDERING
- ACID CHAMBERS
- CONCRETE CURING

Write for Catalog 1

Monarch

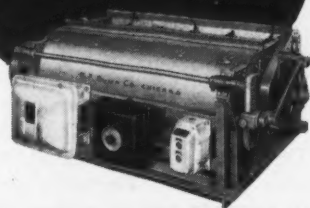
MFG. WORKS, INC.

3403 GAUL STREET
PHILADELPHIA 34, PA.

Check 3552 opposite last page

CHEMICAL PROCESSING

Here's the way
to regulate bulk feeding



DRAVER FEEDERS

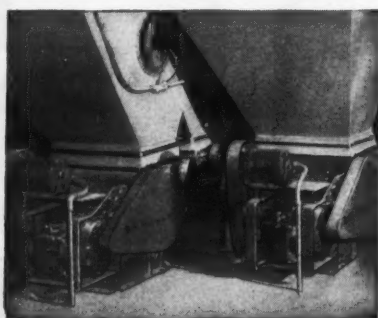
with or without automatic timing controls

Here's the way to keep production units—grinders, sifters, mixers, etc.—operating steadily at most efficient capacity. A Draver capacity regulating Feeder assures a continuous, uniform flow of material to the machine . . . prevents dangerous overloading and wasteful underloading . . . helps maintain quality control . . . repays its cost many times over in a smoother running production system.

Even sticky, hard-to-handle materials can be accurately regulated by dependable Draver Feeders—at rates from ounces to thousands of pounds an hour. Timing controls are available for feeding preset amounts at automatic intervals to continuous or batch processes.

What is *your* bulk feeding problem? Send details, and our engineers will be glad to make recommendations on a Draver Feeder that will save you production time and money. No obligation, of course.

Draver "Micro-Master" Feeders, mounted at floor level, feed to mixing equipment below.



FEEDING • MIXING • SIFTING • WEIGHING • PACKING
EQUIPMENT FOR THE PROCESS INDUSTRIES

B. F. GUMP Co.

Engineers & Manufacturers Since 1872

1344 S. Cicero Avenue • Chicago 50, Illinois

Check 3553 opposite last page

FEBRUARY 1959



Spotlight On People



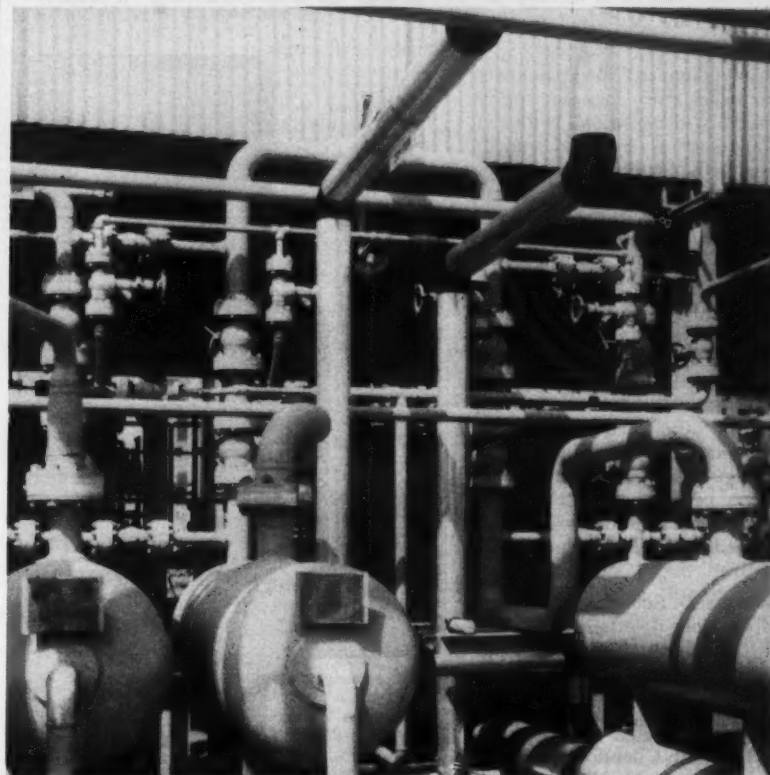
At Shell Chemical Corporation, a company reorganization went into effect January 1 involving formation of four additional fully

integrated divisions. ALFRED W. FLEER, former general manager of manufacturing, technical, heads the industrial chemicals division. (Fleer is a member of CHEMICAL PROCESSING's Editorial Advisory Board.) MARTIN BUCK, who was assistant to the president, is chief of the plastics and resins division. SUMNER H. McALLISTER, former manager of agricultural chemical sales division, heads the agricultural chemical division, and LAWRENCE M. ROBERTS, who was manager of operations in the ammonia division, now is in charge of that division. BERNARD M. DOWNEY, formerly general manager of manufacturing operations, and GEORGE W. HULDRUM JR., who was manager of chemical sales division, are vice presidents.

EUGENE C. SWIFT, vice president of The Sharples Oil Corporation, also takes over duties as president of The Sharples Corporation. He will serve actively in both positions.

Changes in Union Carbide Corporation management finds MORSE G. DIAL assuming the newly created office of chairman of the board. He continues as chief executive officer. HOWARD S. BUNN, executive vice president, becomes president. KENNETH H. HANNAN continues as executive vice president, BIRNY MASON JR., vice president, becomes executive vice president and, with KENNETH RUSH, vice president, has been added to the board of directors.

DR. LOUIS K. EILERS is named first vice president of the Tennessee Eastman Company and the Texas Eastman Company, divisions of Eastman Kodak Company, and president of Eastman Chemical Products, Inc. Dr. Eilers succeeds WILLIAM S. VAUGHN, who is elected vice president



ORBIT VALVES shown above are installed on suction and discharge of Hydrogen Compressor.

Orbit forged steel valves were chosen for the above application because of their vapor-tight construction and non-lubricated, positive closing feature. There are no voids or cavities in the body or bonnet where pressures can build up from trapped fluids when the valve is either in an open or closed position.

Please specify service intended when ordering Orbit valves. For other special applications, our industrial division will be glad to help you with your particular service problem.

Orbit valves have a long history of performance in LP products, natural gas, air and industrial gases.

SIZES: 1", 1½", 2", 2½", 3" and 4" ASA 300-lb thru 2500-lb, full opening flanged and screwed ends. Venturi opening available in sizes: 2", 2½", 3", 4" and 6" ASA 150-lb thru 2500-lb flanged ends only.

SOURCE: Through your favorite industrial supply house.

LITERATURE: Write Department B for Catalog 58-B.

ORBIT VALVE COMPANY

P. O. BOX 699, TULSA, OKLAHOMA, Phone Luther 4-4761, TWX TU 925
WAREHOUSES: HOUSTON, TEXAS, 407 Velasco, Capitol 8-6623, TWX HO 115; ODESSA, TEXAS, 402 West County Road, Federal 7-2263, TWX ODESSA TEX 8706; LAFAYETTE, LOUISIANA, 3111 Cameron St., Center 4-3326; CASPER, WYOMING, 414 South Elm Street, Phone 2-1324; EDMONTON, ALBERTA, CANADA, 7119-104th St., Phone 391-283.
WEST COAST REPRESENTATIVES: Charles Lowe Company, 383 Fourth Street, San Francisco, Calif.; Marshall E. Niedecker Company, 2785 Cherry Ave., Signal Hill, Calif. CANADIAN REPRESENTATIVES: T. R. Pickford & Company, Ltd., Calgary, Alberta, 309 7th Avenue West; Amherst 2-7371. EXPORT REPRESENTATIVE: New York 36, N. Y., 500 Fifth Avenue, Bryant 9-2236.

Check 3554 opposite last page

PEOPLE

and general manager of Eastman Kodak Company.

E. DUER REEVES is elected executive vice president of Esso Standard Oil Company.

Dow Chemical Company announces two changes in its board of directors as Dr. E. O. BARSTOW of Midland, Mich., and R. L. CURTIS of San Francisco retire. DONALD K. BALLMAN, director of sales, and C. B. BRANCH, manager of plastics department, are elected to replace them. Dr. Barlow, who also retired as vice president, becomes honorary chairman of board, a newly created position. Curtis continues as a vice president and will remain senior officer on West Coast. LELAND A. DOAN, Western Division assistant general manager, replaces Curtis as division general manager, a position from which Curtis also retired.

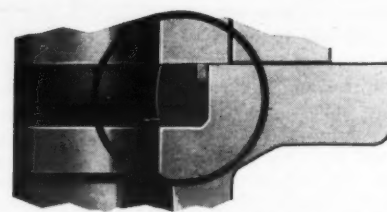
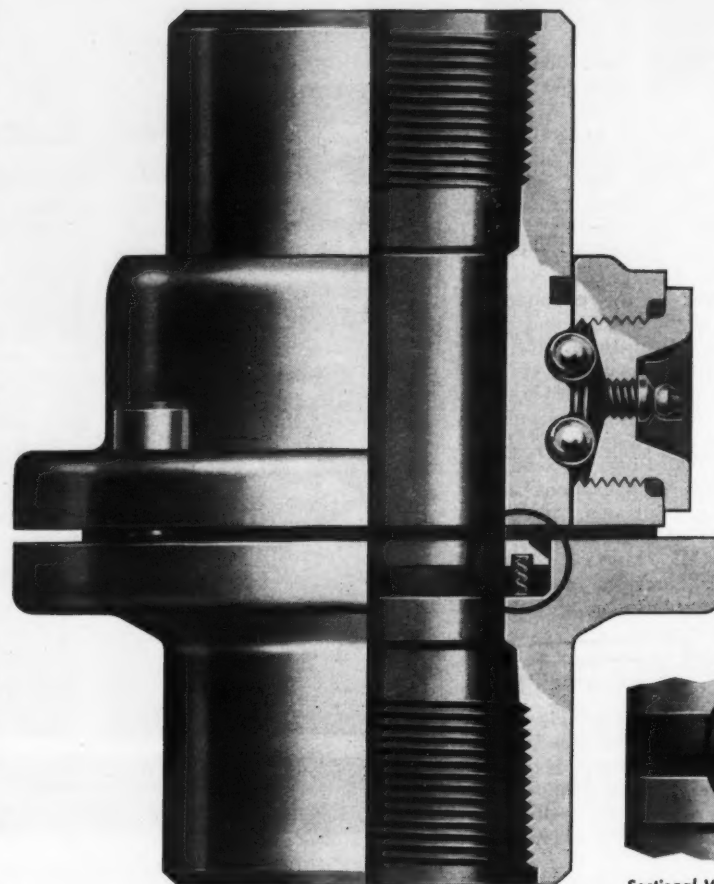
ROBERT D. SCOTT is named vice president, development, of B. F. Goodrich Chemical Company. He succeeds HARRY B. WARNER, who is appointed vice president, marketing.

At Allied Chemical Corporation, FRANK M. NORTON is appointed vice president of the Plastics and Coal Chemicals Division, in charge of engineering, manufacturing, and purchasing. Succeeding him in his former post as a vice president of Semet-Solvay Division is HAROLD E. IMES, who has been director of operations for the division. RALPH H. RATLIFF succeeds Imes as operations chief.

In changes at American Cyanamid Company, R. A. HOEKELMAN is appointed director of customer relations, a newly created post; L. J. FRANCISCO is named general manager, and W. D. HOLLAND assistant general manager. EUGENE C. MEDCALF is named manager of the intermediates department, and Dr. LEONARD G. TOMPKINS is made technical manager for the petrochemicals department of the Organic Chemicals Division.

HARRY E. CONNORS is new product manager of paste resins for Diamond Alkali Company.

For Trouble-Free Flexibility on Steam, Hot Gas, Chemical Service Lines



Sectional View showing typical molded packing installed

NEW CHIKSAN

DS

REPLACE SEALS WITH SWIVEL JOINT IN LINE

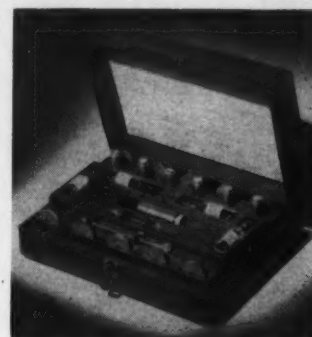
Allen-type screws secure the two sections of the DS series swivel joint. Screws are readily removed and seals replaced with joint in the line.





nuclear notes

Significant news about atomic energy



Radioactive standards and sources

Group of four certified radioactive standards in solution and a variety of 16 sources all in AEC license exempt quantities, are being offered as a complete set. Supplied in flame-sealed glass ampoules, the standards and sources are ideal for making absolute calibrations of counting systems. Sets come in a walnut case along with a source handler, instructions booklet, and 100 microliter pipette with syringe.

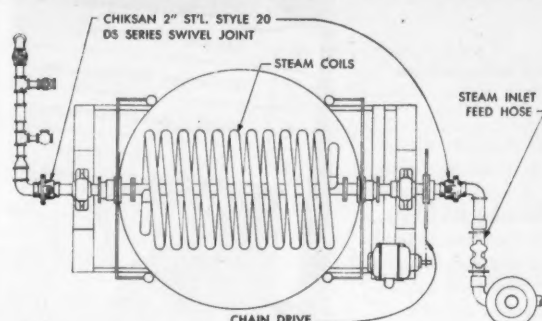
(Model SK-1 radioactive standards and sources set are product of Nuclear-Chicago Corp., 229 West Erie St., Chicago 10, Ill.)

Check 3556 opposite last page.

Nuclear accidents and safety rules

Nuclear accidents resulting from improper storage or handling of slightly enriched uranium fuel elements will not occur if carefully developed safety rules are observed, according to N. Ketzlach, General Electric physicist at Hanford Laboratories. Speaking at a recent meeting of the American Nuclear Society, he said the encasement of 0.95 per cent enriched fuel elements in 3/8-inch iron pipe is sufficient to prevent the fuel from achieving a critical mass. For higher enrichments, the pipe should be somewhat thicker.

ROTATING STEAM COIL IMPROVES COOKING QUALITY, CUTS COSTS

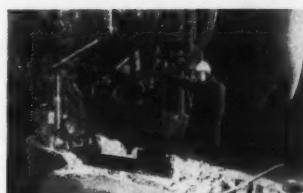
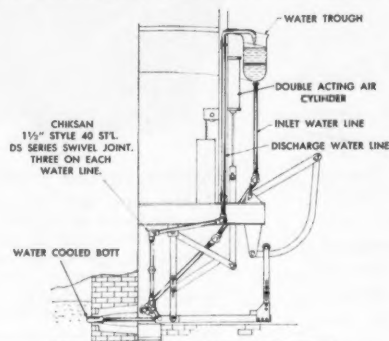


For more details, request application report .009

Stationary steam coils in a large food processing plant were accumulating burned scale, reducing heat transfer by as much as 20% in a relatively short time.

Using Chiksan DS series swivel joints, the plant engineer designed a self-scouring rotating coil. Net results, this plant now gets closer flavor and quality control—also sustains heat-exchange efficiency—thus saving fuel.

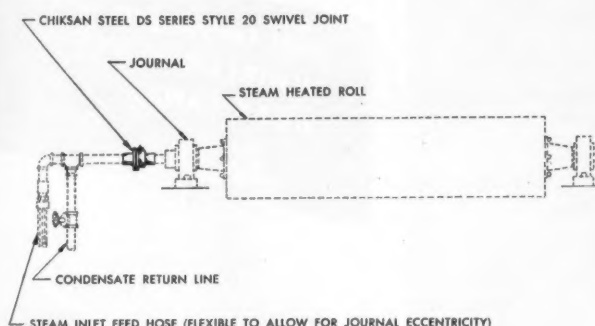
SWIVEL JOINTS HELP PULL THE PLUG ON MOLTEN SLAG



For more details, request application report .014

Pulling the water cooled bott permits removal of molten slag from blast furnaces. Proximity to the intense heat made rubber hoses out of the question. And even ordinary swivel joints weren't faring too well because packings would bake out in a day or two. New Chiksan DS series swivel joints deliver the solution, providing ten to twelve weeks of service before packing replacement is required.

STEAM STAYS ON THE BEAM WITH CHIKSAN SWIVEL JOINTS



For more details, request application report .004

To emboss plastic sheets, the material must be heated to a just-right degree of softness. A steam leak at the swivel joint connecting the stationary steam pipe to the revolving inlet means serious trouble. Previous tried devices were unsatisfactory. A DS series swivel joint was recommended. Present joint has been in service for better than four months with superior results. And when packing fatigue does occur, it can be quickly replaced with a minimum down time.

SWIVEL JOINTS SERIES



CHIKSAN COMPANY, 330 North Pomona Avenue, Brea, California

Please send me copy of Bulletin 1258.

Please send me product application report .004 ☐ .009 ☐ .014 ☐

Name

Company Title

Address

City Zone State

CHIKSAN



A SUBSIDIARY OF FOOD MACHINERY AND CHEMICAL CORPORATION

CHIKSAN COMPANY—Brea, Calif. • Chicago 5, Ill. • Newark 2, N. J. • Waco (Division), Houston 1, Texas • Subsidiaries: Chiksan Export Co. • Chiksan of Canada Ltd.

Check 3555 opposite last page

prevent corrosion

...with **CHEMISEAL®**
Fluorocarbon
Plastic linings



**United
States
Gasket**

From a reactor pot to a tank truck—Chemiseal Fluorocarbon Plastic linings, offer the way to make any ordinary equipment and piping extremely resistant to acids, alkalies, oxidants and solvents at temperatures up to 350°F—and at reasonable cost.

Chemiseal Fluorocarbon Plastic linings, Garlock No. 9574, are durable, shatterproof, abrasion resistant, chemically inert. They are readily cemented over any contour and to any material of construction—metal, wood, concrete, etc. Being a thermoplastic resin, seams may be "welded", on the job by the thermal pulse technique, into a continuous chemically-impregnable lining.

CERTIFIED APPLICATORS—Chemiseal Fluorocarbon Plastic lining material is manufactured by the United States Gasket Company, pioneers and leaders in fluorocarbon plastics, and is available for installation by certified applicators.

Write for Bulletin AD-152, and name of applicator nearest you.

UNITED STATES GASKET COMPANY
Camden 1, New Jersey

Plastics Division of
GARLOCK



Check 3557 opposite last page

NUCLEAR NOTES

Gratis security clearances discontinued by AEC

No more free security clearances will be granted to holders of AEC access permits. Charges established for personnel security clearances are: \$385 for "Q" clearance, \$15 for "L" clearance. Revised policy went into effect January 1, 1959, but does not affect non-profit educational institutions.

'Off the shelf' fuel elements

Standard fuel elements for nuclear reactors are being produced for "off the shelf" purchases. Four types are available, based on successful fuel elements now in use in both U.S. and abroad. Manufacturer states that these are the first of a series. Others will be available soon.

(Nuclear fuel elements are being manufactured by Sylvania-Corning Nuclear Corp., Bayside, Long Island, N. Y.) Check 3558 opposite last page.

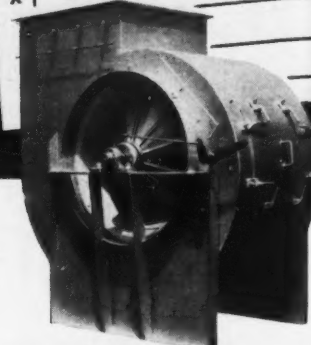
By-product MgF_2 slag offered by AEC

Magnesium fluoride slag containing small amounts of normal uranium is being sold by AEC. Material is by-product of Commission's normal uranium metal production. Product contains about 3% uranium and is in the form of a grayish powder.

Commission has set charge of \$26 per kilogram of contained uranium on the slag, f.o.b., Weldon Springs, Mo. Since slag contains normal uranium it can be sold domestically only to persons licensed by AEC. Product is available on run-of-the-plant basis in 55-gal drum lots; each drum containing about 550 lb of slag.

(Further information about magnesium fluoride slag may be obtained by writing to S. E. Sapirie, Manager Oak Ridge Operations Office, U.S. Atomic Energy Commission, Oak Ridge, Tenn.)

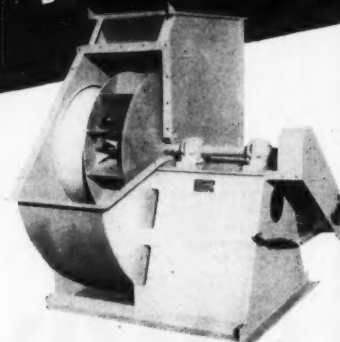
X	Rugged Construction
X	Minimum Maintenance
X	Wide Operating Range
X	Flexible Arrangement



Whirlex Forced Draft

heavy duty fans are designed for service in all types of boiler and industrial applications. Special design airfoil impellers provide maximum static efficiency. All-welded housing construction allows for a dust-proof, leak-proof operation.

Built for rugged service
**WHIRLEX HEAVY
DUTY FANS**



Whirlex Induced Draft

heavy duty fans are available with either straight or evase type self supporting stacks. Special shaft cooling sleeves allow for the efficient use of air cooled bearings. Water cooled bearings can be furnished if desired.

Write for complete information on these and other types of Whirlex industrial fans.

**Fly Ash
Arrestor Corp.**
200 N. 1st Street
BIRMINGHAM, ALA.



Check 3559 opposite last page
CHEMICAL PROCESSING

THAT'S
INTERESTING

Over to you
man in moon

Perhaps it won't be too long before we hear from the man in the moon. And when we do, this lunar contact will be reported by a radio ear powerful enough to pick up signals for a distance of 400,000 miles — and more. The earth ear, a giant radio telescope, weighs some 200 tons and rises 110 ft from the California desert floor. Its dish-shaped antenna is 85 ft in diameter. Scientists foresee possible extension of the tracking facility's range to four billion miles by 1962.

1957 went
up in smoke

Fire losses in the U.S. reached the highest point in history in 1957. Property destruction totaled over one billion dollars in more than two million recorded fires. Topping list of building fire causes were smoking and matches.

For more information on product at right, specify 3560 see information request blank opposite last page.



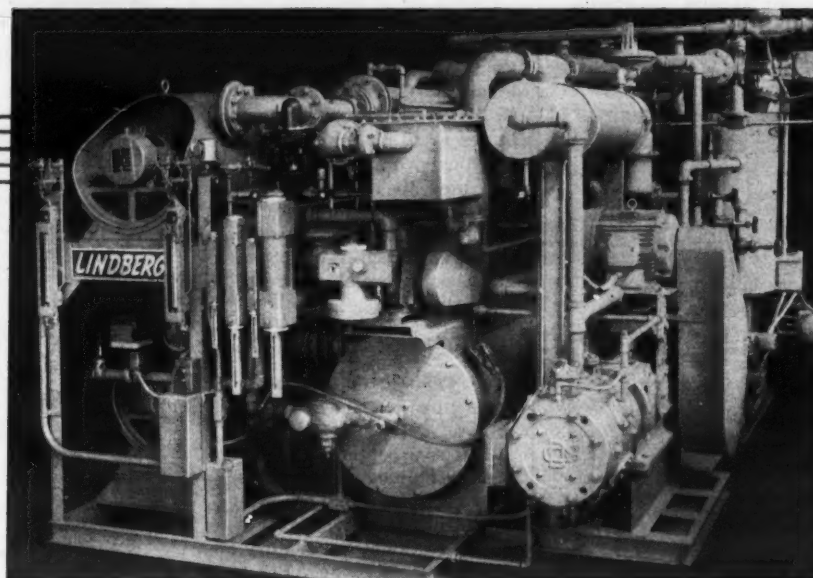
***Atmosphere of 99.99% inert gases now provided by new Lindberg HYNi Generator**

****Completely new, fully automatic, dry process provides highest degree of nitrogen purity**

*****This process produces nitrogen for only \$0.17 to \$0.20 per 1000 cubic feet**

In chemical processing, this superior nitrogen atmosphere is useful in blanketing processes under non-flammable, non-oxidizing, non-toxic, and bacteria-free conditions. It is ideal, too, for purging, bubble agitation, displacement of air, and pneumatic conveying. In the

metals industry, this high purity nitrogen atmosphere is used for annealing, normalizing, brazing, hardening, and sintering. In food processing this inert atmosphere protects product quality, flavor, color, odor and appearance from contamination, oxidation, or bacterial action.



This new HYNi generator is an important addition to Lindberg's complete line of controlled atmosphere generators. It is available in capacities from 1,000 to 10,000 SCFH. Write us for complete information on this remarkable new unit, and other Lindberg generators for any required atmosphere type.

**** How The Process Operates**

This 99.99% pure atmosphere is produced by a completely new, dry, fully automatic process. It uses the principle of burning a hydrocarbon fuel in a separate catalytic combustion chamber to obtain complete reaction without unburned methane, high residual oxygen or a high percentage of oxides of nitrogen. Carbon dioxide, water vapor, sulphur dioxide or hydrogen sulphide are simultaneously removed in a dry, absorbent material known as Molecular Sieve made by Linde Division of Union Carbide and Chemical Corporation.

*** Sample of Analysis**

Obtainable With HYNi Generator

Oxygen.....	0.00%
Carbon dioxide.....	0.01%
Hydrocarbons.....	0.00%
Water vapor:	
Less than -80° F. dewpoint	
(7 p.p.m. when measured	
by a Beckman Hygrometer)	
Hydrogen.....	0.00%
Carbon monoxide.....	0.00%
Sulphur.....	0.00%
Oxides of nitrogen.....	0.00%
Nitrogen and Argon (trace).....	99.99%

***** This Process is Economical**

One of the advantages of this process of producing nitrogen is its low cost. With the HYNi Generator the nearly-pure nitrogen is produced for only \$0.17 to \$0.20 per 1000 cubic feet. Cost of power, raw gas and cooling water is included and based on: fuel gas at \$0.60 per 1,000,000 BTU; electricity at \$0.01 per KWH; cooling water at \$0.05 per 1000 gal. Quoted cost does not include maintenance or amortization. Lindberg quality design and construction assures complete dependability and lowest maintenance cost.



GAS PROCESSING DIVISION

ENGINEERING COMPANY

2480 West Hubbard Street, Chicago 12, Illinois

**Positive bin level control—
no overflows...no empties**

with
STEPHENS-ADAMSON
"TELLEVE"
BIN-LEVEL CONTROLS



- Pendant float-ball or float-cone, operates sensitive switch to regulate level of bulk materials.
- Installed at various bin levels, the unit will start or stop flow of materials automatically.
- Will operate signal light or horn.

3 MODELS AVAILABLE

- Explosion-Proof
- Bin-Level
- Heavy Duty



WRITE FOR BULLETIN 11-0
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STEPHENS-ADAMSON MFG. CO.
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PLANTS LOCATED IN: LOS ANGELES, CALIFORNIA
CLARKSDALE, MISSISSIPPI • BELLEVILLE, ONTARIO

Check 3561 opposite last page

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**FREE BROCHURE
TELLS YOU HOW**

Now learn how you can clean up combustible pollutants, fumes and odors from your processes. An Oxy-Catalyst System can be engineered to your special requirements. Catalytic oxidation is the most effective air pollution control and waste heat recovery method ever developed! Installation often leads to actual fuel savings. Investigate! Send today for brochure, "Oxycat Systems"—packed with facts and figures on typical industrial installations. Mail coupon below.



OXY-CATALYST, INC. Wayne 7, Pa., U.S.A.

Catalysts for fume and odor elimination, air pollution control and waste heat recovery
Send me free brochure, "Oxycat Systems"

Name _____
Firm _____
Street _____
City _____ Zone _____ State _____

Check 3562 opposite last page

NUCLEAR NOTES

Boron plays big role at Enrico Fermi plant

Four thousand pounds of boron will be used as an alloy in the 500-ton, steel shielding floor of the nuclear reactor at the Enrico Fermi power plant, near Monroe, Michigan. Metal will help shield the operating floor from gamma rays emitted by the fast breeder reactor.

R. C. Mahon Company, Detroit, Michigan, holds the contract to furnish all the steel shielding involved for the 72-foot diameter reactor building. The steel floor will vary in thickness from 3½ to 14 inches, and will be covered with concrete 4 feet thick.

Radioactive drug patent issued to Pfizer

Patent on production of radioactive Terramycin and two related broad-range antibiotics has been issued to Chas. Pfizer & Co., Inc., Brooklyn, N. Y. Products are important in research studies of how antibiotics work against germs and how they are distributed and changed in the body. The antibiotics are not used in therapy, hence do not have great commercial interest.

New cyclotron facility going up at Oak Ridge

Selection of a firm to provide architect engineer services for a new advanced type cyclotron facility at Oak Ridge National Laboratory has been announced by AEC. Catalytic Construction Company, Philadelphia, Pa., has begun design of the cyclotron facility. Union Carbide Corporation will design the machine and associated equipment, with Catalytic providing engineering assistance in Oak Ridge during the design.

The facility will cost about \$3 million and is expected to be completed by late 1960. Machine will be known as the Oak Ridge Relativistic Isochronous Cyclotron (ORIC).

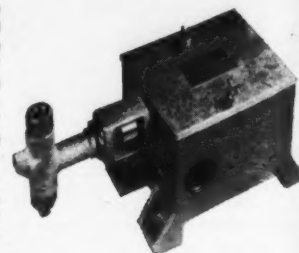
TEXSTEAM SAC 4000 INJECTORS

Length of piston stroke is adjusted in infinitesimal increments from zero to 1" by a thread and nut arrangement to insure precise and highly accurate control of injection volume. Length of stroke is indicated on a calibrated scale, which also serves as locking device for the adjusting nut.

SAC 4000 can be equipped with single or dual injector heads, to double the volume or allow injection of dissimilar additives with one unit. A worm-gear piston drive provides ample power for high pressure service . . . assures vibration-free operation. In addition to the standard gear ratio of 50/1, SAC 4000 Injectors can be furnished with gear ratios of 25/1, 75/1 and 100/1.

SAC 4000 injectors handle all classes of chemicals, aqueous solutions, liquid lubricants and liquefied gases. They may be operated by a ¼ hp, 1750 rpm electric motor, a ¾ hp gasoline engine or any other rotating power source. Two or more injectors can be connected in tandem to one power source. Injection volumes range from 1 pint to 160 gallons per day per unit.

Complete specifications, capacities, available on request. Ask for Bulletin PI-572.

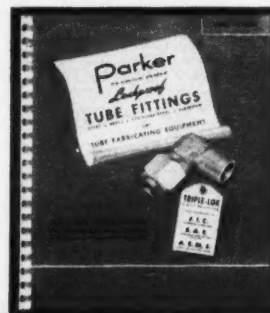


TXT **TEXSTEAM** Corporation
A SUBSIDIARY OF VAPOR HEATING CORPORATION
230 HUGHES ST. • P.O. BOX 9127, HOUSTON 11, TEXAS • PHONE WA 6-8933

Check 3563 opposite last page

PROCESS
LINES?

INSTRUMENT
LINES?



**This 128-page Parker Tube
Fittings Selector will help
you with your layouts**

With the complete Parker Fittings Data Book, you can quickly select the correct type, shapes, alloys and sizes of tube fittings to handle any process or instrument fluid from low-pressure air to high-pressure steam, gases or liquids. Book fully describes all five types of Parker ferrous and non-ferrous Tube Fittings for use on metal or plastic lines from ¼" to 2" diameter . . . "Intru-lok," "Triple-lok," "Ferulok," "Weld-lok," "Braz-lok."

For a copy of the Parker 4300 Catalog, call your Parker distributor, listed in the Yellow Pages. Or write to . . .

Parker FITTINGS AND HOSE DIVISION
17325 Euclid Avenue • Cleveland 12, Ohio
A DIVISION OF PARKER-HANNIFIN CORPORATION

Check 3564 opposite last page

CHEMICAL PROCESSING

Urethane Foam Market Study Made by Allied Chemical

Use of urethane interlinings in clothes will grow from an estimated one million yd this year to approximately 15 million yd by 1960, says Dr. O. M. Morgan, director of chemical sales, Allied Chemical Corporation's National Aniline Division.

Allied also says urethane foam consumption by the furniture industries should reach 2 million lb this year and 15 million lb by 1960.

These materials — sometimes called polyurethanes — are now being used in manufacture of foams which can be made as soft as down or as hard as an abrasive. Other uses are in adhesives, which bond just about any material to any other kind of material. Even coatings have been developed which protect concrete floors normally eaten away by strong acids.

And Allied's opinion is that these promising new chemicals spell a bright future for both the company and its customers. Allied has a basic position in the market. The National Aniline Division turns out five diisocyanates and the Barrett Division produces polyesters.

Allied's Competition

Two other majors in the field are Mobay Chemical Company and Du Pont. All three are producers of diisocyanates. But as yet there has been no "hard-sell" competition in the field. The burgeoning increases expected probably will only pay for some of the development costs. Consequently, interest of all producers is mainly to stimulate and encourage the industry, hoping that within a reasonable time the foam business will be profitable.

"Major break-throughs" are thus being hailed. Every additional use which promises volume consumption and commercial status is being eagerly watched and evaluated.

What's Coming?

Allied's estimate is that urethane foams are now in

a position to compete for the 300 million-lb foam rubber usage chalked up in 1957.

How does Allied expect consumption to grow? National Aniline market researchers expect the auto industry to consume 7 million lb of diisocyanate foams in 1958 . . . and grow at a rate to reach an estimated 70 million lb in 1960. The bedding and clothing industries account for 3 million lb today, and are expected to reach 30 million lb by 1960.

If the production molding industry is able to develop a satisfactory closed molding technique, Allied expects total urethane flexible foam consumption to jump from 12 million lb as of 1957 to 70 million lb in 1960.

Rigid urethane foam also represents a major volume market. But rapid progress is not expected until more research has been completed. A 5-million-lb consumption figure was forecast for 1958. Consumption of rigid urethane in 1960 will approach the 40-million-lb level.

Other applications are expected to be in the area of urethane elastomers. (This is the source of the so-called "hundred thousand mile tire".) Present consumption is only about one million lb. Only a small amount of growth is expected before 1960, and this should run to about a 3-million-lb total.

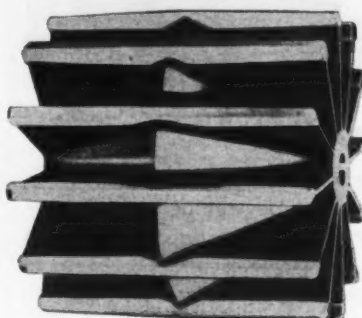
As to coatings, Allied forecast consumption should reach upward of 300,000 gal in 1958, increasing to 3 million gal in 1960.

But Allied says market studies indicate the largest volume use of urethane plastics probably lies in construction of houses. Since walls can be made by pouring foam be-

SPROUT-WALDRON *Pointers*

for Mixing and Blending • Size Reduction • Pelletizing and
Densifying • Size Classification • Bulk Materials Handling

Published in the interest of better processing by Sprout, Waldron & Co., Inc., Muncy, Pa.



Stretch Your Conveyor Dollars With Sprout-Waldron Belt Saver® Pulleys

With maintenance costs at an all time high it is worth taking a careful look at the famous Sprout-Waldron Belt Saver® Pulley which has proven its ability to increase conveyor belt life from 50-400%. These cast iron wing and cone quality pulleys prevent crushing of the material between the face of the pulley and the bottom side of the belt. Sharp lumps and abrasive materials slide away from the pulley adding years of service life to the belt. Whether you are handling crushed stone, sand, asbestos, soda, limestone, cupola slag, salt, fertilizer,

concrete, gravel or any other abrasive or difficult to handle material, Sprout-Waldron Belt Saver Pulleys can extend the life of your conveyor belts or bucket elevators and minimize your shutdown and maintenance costs.

The following chart which compares Sprout-Waldron cast wing Belt Saver Pulleys with fabricated wing pulleys tells its own story. Our unmatched experience is at your disposal.

For sizes and prices of Belt Saver Pulleys, write for Bulletin 35-D.

Characteristics	Sprout-Waldron Belt Saver Pulleys	Fabricated Pulleys
Construction	Cast Iron	Fabricated
Outside Diameter	Precision ground to insure a smooth surface; crown is exact in pitch and is in dead center	Not ground; distortion during welding makes it difficult to maintain exact pitch of crown or to keep in exact center
Hubs	Both hubs are precision bored	Bored on one end only
Bore Length	Extra long to reduce shaft stress—3½" bore length for 2½" shaft	Short bore—2" bore length for 2½" shaft
Ribs	Fewer ribs needed because belt contact area is greater	Extra ribs required, this means less space for large pieces to discharge. Greater possibility of damage

The above chart was made after careful examination of a widely advertised line of fabricated steel wing pulleys. All the points enumerated may not be true for every competitive pulley, but they are certainly worth your careful review.

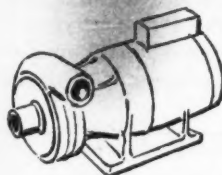
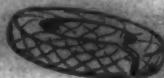
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Nobody knows this RING BUSINESS like an old "PRO"



As a pioneer manufacturer of mechanical packings, Allpax has had extensive experience in developing and fabricating packing materials for the most exacting requirements of industry. Allpax rings for valves and pumps have proved themselves consistent winners through performance and preference in the field. All types are supplied in either molded, mandrel cut or endless form with butt or mitre joints.



✓ For manufacturers —

Allpax Rings cut costs and do a better job because they are precision-made in a complete range of sizes and a wide variety of materials. Right types available for each pump or valve requirement for whatever material handled.

✓ For replacement —

Accurate dimensions and proper types make replacement easier—insure a tight seal without danger of scoring or unnecessary wear on shafts or valve stems.

Use Allpax rings for:

GENERAL SERVICE • PETROLEUM SERVICE • STEAM • WATER • AIR •
HIGH and LOW TEMPERATURE • ACID and CHEMICAL SERVICE ETC.

Each ring made to exacting packing requirements



ALLPAX

"The Packing that Packs All"

SEND FOR OUR CATALOG — TODAY!

A complete line of packing, tools, gasket materials
Distributors in principal cities

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CANADIAN DISTRIBUTORS: Albion Asbestos Packings Ltd., Montreal 8, Quebec

Check 3566 opposite last page

CHEMICAL BUSINESS

tween sheets of wood, plastic and metal, homes soon may be built of huge urethane "sandwiches" which provide insulation, sound damping, and structural reinforcement all in one.

Such a new kind of one-story panelized house would not only cut assembly costs drastically but also offer the home buyer a whole new concept in housing. Panelized houses later might be disassembled and moved to a different location.

Whether any of these become reality, Allied is certain that urethane-based products will mean attractive opportunities for profits and growth.

Quaker Oats launches \$10,000 contest to find levulinic acid market

The Quaker Oats Company is looking for ideas, and will pay a total of \$10,000 for those which best delineate the most significant and apt commercial use for a new product—levulinic acid, $\text{CH}_3\text{COCH}_2\text{CH}_2\text{COOH}$.

Top prize is \$5000. Second prize is \$2500; third, \$1000; fourth, \$500. There also are 100 fifth prizes of \$10 each.

Levulinic acid, a new chemical, is the result of an expenditure of \$500,000 and six years' research. Its principal potential use thus far seems to be that of an intermediate, Quaker chemists say.

Contest entries must be the work of an individual and not of a group. An entrant's "big idea" must be limited to 500 words or less. Prizes will be awarded on the basis of originality, economics, practicability, uniqueness, clarity, and aptness of thought and expression. Entries must be typewritten, double-spaced, on one side of white paper.

All entries must be postmarked on or before March 1, and be received before March 7. Entry must be the original work of entrant.

Entries are to be addressed to "Big Idea Contest," P. O. Box 999, Evanston, Ill.



HIGH EFFICIENCY

DUCLONES®

assure maximum recovery
at lowest cost

DUCLONES—Ducon high efficiency cyclones—are designed and constructed for high recovery efficiency and low gas resistance. Their sturdy construction assures long, continuous service with a minimum of maintenance.

The exceptional performance of Duclon collectors is the result of these 6 unique features:

1. Small Diameter produces high efficiency
2. Helical Roof provides a turbulence-free path for the entering gas stream
3. Steep Cone improves dust separation
4. Dust Trap assures efficient dust removal from the cone
5. Vortex Shield prevents re-entrainment of dust in upward gas vortex
6. Scroll Outlet provides a low resistance clean gas outlet

send for Bulletin C-958.



THE Ducon COMPANY, INC.
147 EAST SECOND STREET • MINEOLA, L. I., NEW YORK

Check 3567 opposite last page

CHEMICAL PROCESSING

THAT'S INTERESTING

Fuel cell developed

A fuel cell that turns chemical energy directly into electrical energy with little or no waste has been developed by Lockheed Aircraft Corp. According to *Business Week*, the fuel cell has produced electricity with an energy conversion factor of almost 70% and fuel utilization of almost 100%.

Pipe welds softened

System described as similar to "building a furnace around the weld" softens tight and hard new pipe welds. Molded material primarily composed of aluminum powder, metal oxides, refractory materials and binders is placed around weld, covered with insulation, and ignited. (*The Esso Research and Engineering News*, Esso Research and Engineering Company)

For more information on product at right, specify 3568 see information request blank opposite last page.



Which of these 3 products and services can you use from BECCO?

New Cold Caustic Bleach Process

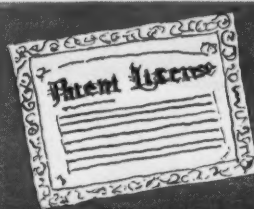
Looking for a way to use greater amounts of low-cost, more plentiful pulp—without capital investment for bleach equipment? Then let a Becco Sales Engineer show you our new technique* which allows you to bleach in the same equipment regularly used for the manufacture of cold caustic pulp.

In this new process, peroxide bleach liquor is added at the Bauer Refiner, and bleaching occurs during the refining operation. Bleach response depends on refiner densities.

Up to 20 points brightness increase has been obtained in commercial operations to date, and with no additional steam costs, no holding time, and no excessive chemical costs.

Becco can assist you immediately in setting up a production run and evaluating results. First step: use the coupon to let us know you're interested.

*—Patent Pending



"Enclosing \$1.00 —
Send Patent License"

Well, perhaps there's a little more to your gaining use of Becco patents than just mailing your dollar in, but not much more. And certainly, no more money. The \$1.00 really does cover it.

Becco has lots of patents, granted as a result of innovations in the use of Hydrogen Peroxide and other Peroxygen chemicals developed in Becco's Research Laboratories. But they don't do us a whole lot of good locked tightly in our safe. So, we long ago adopted the following policy:

If one of our patents can help you, we'll be glad to license the rights to you *perpetually*, for just one dollar. You get a nice certificate, incidentally, to cover the legalities, but more important — you also get free our complete engineering help in setting up your process, handling the material, maintenance, etc., etc.

What do we get? You as a customer — we hope — but there's no obligation on your part. Just seems to work out that way, though — when we know enough about a particular peroxygen to hold a patent on its use, chances are we've also learned enough to produce it purer than anyone else. You benefit from this; we do, too.

Use the coupon below to ask for a Sales Engineer — or our list of patents — that may help you solve an important problem.

Problems in handling Hydrogen Peroxide



Becco's Four-Fold Engineering Service Program — offered free — includes:

1. Comprehensive survey of your facilities.
2. Specific proposal with recommendation of proved equipment and where it is obtainable.
3. Installation supervision by Becco.
4. Periodic inspection and permanent service.

Can you use this free Becco help, based on more years of experience with bulk handling of H_2O_2 than any other manufacturer? Use the coupon to let us know.

BECCO



BECCO CHEMICAL DIVISION, FMC
Station B, Buffalo, New York

Dept. CP-H

Gentlemen:
Please have a Sales Engineer give me more information on Becco's Cold Caustic Bleach Process.

NAME _____
FIRM _____
ADDRESS _____
CITY _____
ZONE _____ STATE _____

BECCO



BECCO CHEMICAL DIVISION, FMC
Station B, Buffalo, New York

Dept. CP-F

Gentlemen:
Please send your list of patents available on the use of

- ☐ Hydrogen Peroxide
☐ Peroxygen Chemicals
☐ Persulfate Chemicals
☐ Please have a Sales Engineer call.

NAME _____
FIRM _____
ADDRESS _____
CITY _____
ZONE _____ STATE _____

BECCO



BECCO CHEMICAL DIVISION, FMC
Station B, Buffalo, New York

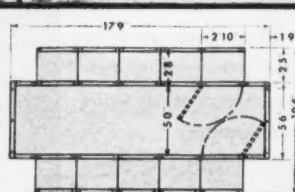
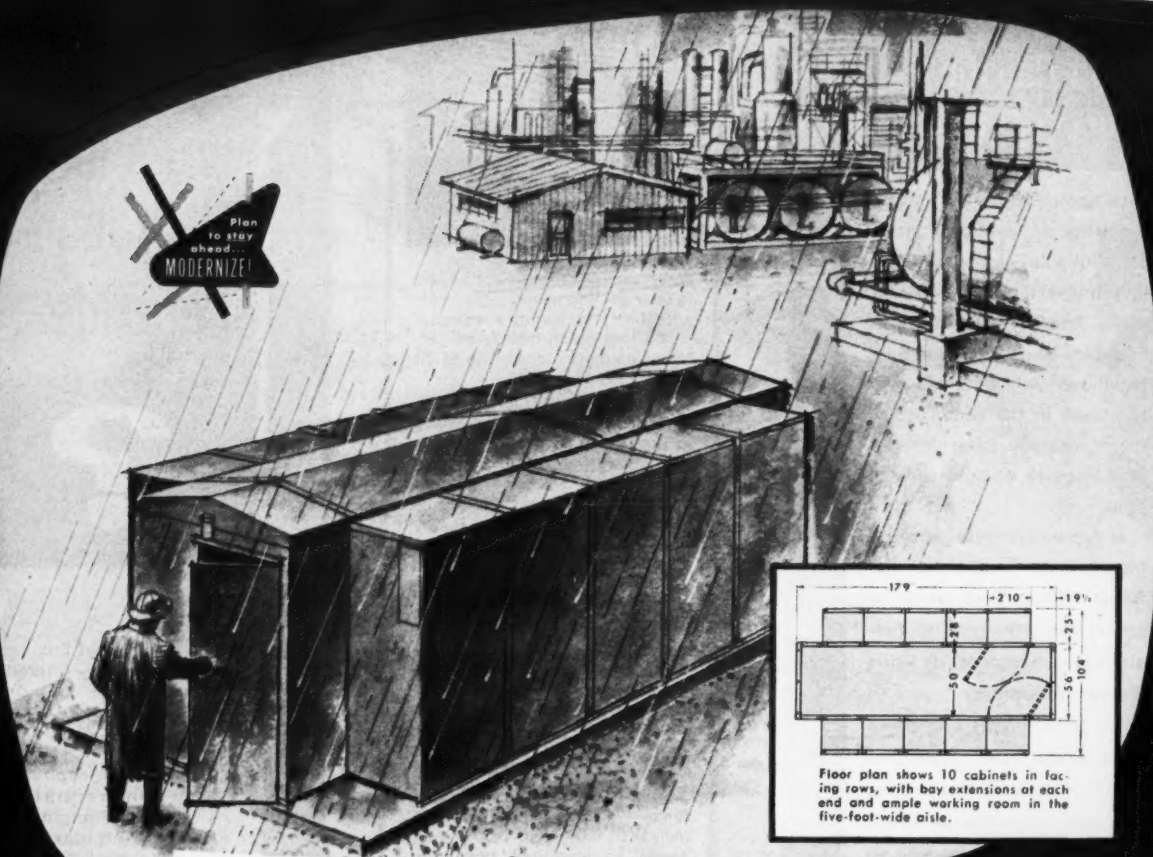
Dept. CP-B

Gentlemen:
Please tell me more about your Four-Fold Engineering Service.

NAME _____
FIRM _____
ADDRESS _____
CITY _____
ZONE _____ STATE _____

full SCOPE of
MOTOR CONTROL from...

ALLIS-CHALMERS



Floor plan shows 10 cabinets in facing rows, with bay extensions at each end and ample working room in the five-foot-wide aisle.

Let it rain, snow or blow...

• New, *Shelter-Clad* walk-in enclosures provide complete protection for personnel and motor control

With the new Allis-Chalmers all-steel, walk-in enclosure, you can eliminate expensive, permanent buildings. Your field personnel can carry on inspection and maintenance work in complete safety and convenience, regardless of the weather. *Shelter-Clad* units can even be arranged to provide space for your field office work.

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For details, contact the A-C office near you, or write Allis-Chalmers, General Products Division, Milwaukee 1, Wisconsin.

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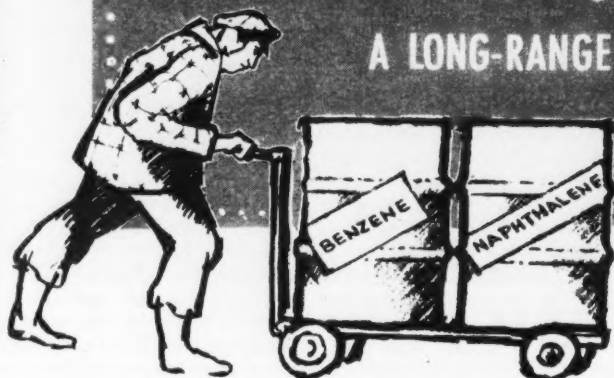


For more information on product at left, specify 3569 see information request blank opposite last page.



IRON CURTAIN AROMATICS

A LONG-RANGE PROBLEM



O. V. TRACY, Vice President, Esso Standard Oil Company

CUT-RATE competition from behind the Iron Curtain poses a serious current and long-range problem for U.S. marketers of benzene and naphthalene, two of our most important chemical products.

Russia and its satellites do not appear to be motivated by political reasons; rather they, like so many many other countries abroad, have a "pressing desire" for American dollars. There is no reason, therefore, to believe that the increasing flow of these vital aromatics from Russian satellites will diminish at least for several years.

Pouring of these products onto the world market is only one instance in which Iron Curtain countries in recent months have been charged with commodity-dumping practices. These also involve tin, textiles, aluminum, and platinum.

This action has had a profound effect on the price structure of benzene and naphthalene, which we in the chemical processing industry are most concerned with. For-

eign naphthalene is consistently offered in this country under U.S. quotations, and imported cargoes contributed to a 5-cent a gallon drop in the benzene market last July. Most imports of these products came from behind the Iron Curtain.

More Benzene Imported

Further proof that more trouble lies ahead is the report that in early October an additional five million gal of these aromatics were received at Houston at prices said to be

at least 5 cents under U.S. quotations.

The lower realizations today for benzene probably will continue at the present level in the foreseeable future. A higher stable price does not seem likely until the gap narrows between supply and demand.

Russian benzene quality is much below that of domestic benzene, hence much of the Russian material must be processed prior to use.

Figures on benzene and naphthalene imports show that in 1955 a total of 29 million gal of benzene were received

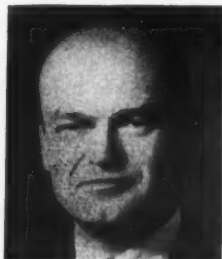
from abroad, but that from now through 1965 the total will be nearly 50 million gal or more a year. Whereas in 1955 these imports accounted for 9 percent of domestic consumption, they will range from 11 to 12 percent from now through 1965.

Sees Demand Increase

It is expected that European demand for benzene and naphthalene will increase, but it is unlikely that this will lessen the volume flowing into world markets. More of these aromatics will be produced soon, both in Soviet satellite countries and in West Germany, because of enlarged coking operations and improved methods of recovering naphthalene.

In early 1959, U.S. potential capacity to produce benzene will be at the rate of nearly 450 million gal annually. (Humble's benzene unit came onstream in 1958; Gulf's plant is expected to be onstream the first half of 1959.) Of this 450

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Nearly 30 years' intimate association with the petrochemical and synthetic rubber fields gives O. V. Tracy eminent qualifications to speak on the inroads Russian-imported aromatic hydrocarbons are making on U.S. markets. Formerly president of Enjay Company, Inc., pioneer petrochemical producer, Mr. Tracy is vice president and a director of Esso Standard Oil Company. He is one of the leaders in development of synthetic rubber, and other chemical products derived from petroleum.

What happens to a joint venture that is very successful? Does the 50-50 ownership handicap it in becoming a full-fledged corporate entity? Shawinigan Resins Corporation hasn't had any difficulties



an experiment in 50-50 management

LAST October, W. Roy Elliot, vice president and general manager of Shawinigan Resins Corporation, located in Springfield, Mass., jokingly promised W. H. (Bill) Bromley, his director of marketing, a Rolls Royce if he could double sales again in five years. Bromley said "You'd better put in an order right now."

Whether Bill Bromley does it or not with the company's present line of polyvinyl resins will depend as much on industry growth as increasing national acceptance of Shawinigan Resins. But Roy Elliot and Bill Bromley, along with other members of Shawinigan's management team, are not relying on industry growth solely to pull the company along, or even on growing customer knowledge of company products. Aggressive programs of research and sales development, plus an extremely sophisticated theory of management, may do the job.

Shawinigan's Different

Of the thousands of corporations in the United States, Shawinigan is almost unique in that it has two owners, each with a 50% share of the business — Monsanto Chemical Company and Shawinigan Chemicals Limited. Consequently, no one has voting control. And according to some theorists of management who ask frequently, "How can it work?", 50-50 management should have exposed Shawini-

gan Resins to more than its share of management turmoil and difficulties.

But the company has prospered without the benefits of a single management, and, indeed, appears to have missed many of the usual causes of managerial strife during its short life. The main reason for this happy state of affairs could be the consistent rate-of-growth and profit picture. And of course healthy dividends have been paid to the two owners. No one shoots Santa Claus.

Dual Parents

Most organizations are often said to be the shadow of one man. Shawinigan Resins, as is consistent with its dual parental history, was created by two men. However, both were associated with only one company.

One was George O. Morrison, inventor of the polyvinyl acetate resins; the other was W. Roy Elliot, both of Shawinigan Chemicals Ltd. Elliot was sent down from Canada to run the plant in 1937.

Shawinigan Resins was founded in 1937 on one product — polyvinyl butyral. At that time the Canadian parent and the Fiberloid Corporation of Springfield, Mass., jointly organized the company to manufacture a replacement for cellulose acetate as an inner layer for automotive safety glass. (Monsanto acquired Fiberloid in 1939.)

During the early years, Shawinigan Resins was interested in production only. There was no need to worry about sales as every pound of product that could be manufactured was saleable.

The production schedule called for butyrals to be produced in 1938 and polyvinyl formals in 1941. But once production of formals had started, manufacturers approached the company to buy polyvinyl acetates and alcohols. Since these were intermediates in making formals, Shawinigan was delighted. Marketing — at a profit — in this manner did not use salesmen or any sales effort on the part of Shawinigan Resins. Parent companies acted as sales agents.

Peacetime Boom

In common with many other industries and companies, Shawinigan hit a doldrum area after World War II's intense activity. As soon as the slack of postwar conversion was overcome, Shawinigan sales again were limited only by production capacity.

Then, in 1949, Bromley organized the development department which is the grandfather of all company marketing efforts today. This department anticipated the market research group of today and included personnel for application research and sales service. (Many people now in Shawinigan's marketing group have come from the development center.)

As the company has matured, more and more authority has been delegated to corporation management. When the company started in 1937 it was governed by a six-man executive committee made up of directors.

The committee had full authority to act for the company, and met with Elliot each month to discuss and consider every aspect of the firm's operation. This group functioned until March 1955, when it was dissolved. In its place was created a six-man operating committee made up of directors, who immediately decided to enlarge its membership to include management located at the Springfield facility.

Two years to the month after it was organized, the operating committee was dissolved. It was replaced by a four-man management advisory committee, also made up of directors. This group meets at the call of the general manager to advise him on any aspect of company operations.

Today's Outlook

Elliot's objective has been to integrate management and operations to the point where the company can stand on its own feet. Creation of the development department in 1949 spearheaded this. Culmination was the organization of the marketing department in 1955.

But even this has not disturbed the "lean look" of Shawinigan's management. Elliot is convinced that the



Springfield, Mass., plant of Shawinigan Resins Corporation

company operates best with only the bare essentials. This has aided in development of an *esprit de corps* which Elliot likes about his organization. He thinks the reasons for it, besides the technical challenge offered by the company, is the fact that a growth company creates opportunity. By keeping the organization small, every employee's abilities are exercised to his full limit.

Basic philosophy of the marketing department has been to sell the people in chemical processing industries who will further process the material, using an engineering and technical service approach. Only vinyl acetate resins and vinyl acetate derivatives — 54 of them — are manufactured and sold.

Why limit the company operations to vinyl acetates? Management considers the company has the background knowledge, and the investment already has been made. With opportunities in the vinyl acetate field as broad as they are today, the company has found it cannot put effort anywhere else.

Today, management considers the company must emphasize technical selling, based on engineering and technical service. Industry knowledge is growing. However, the company hasn't forgotten the fact that it was built on research and the ability to supply a heavy demand for a unique product with needed end-use know-how.

Not that Shawinigan does not have competition. The company actually competes with all other resins and polymers that can be used for the same purposes. These include Nylon, the isocyanates, styrene-butadiene, and so on, together with all the products of 47 other polyvinyl acetate producers.

Management's sales philosophy is that the company must make a strong contribution to a customer's problems or the company cannot continue to sell successfully. One pet peeve of a customer, so far as Shawinigan salesmen are concerned, is the "I will get you the answer" routine. Shawinigan believes a salesman's personal prestige and that of the

company demand better than just routine answers about product and applications.

What About the Future?

With the capability of self-analysis that the company management appears to have (Bromley says constantly, "How should the company act if it were not in a growth industry?"), Roy Elliot may have to come through on his joking gesture of a Rolls Royce for Bill Bromley. Small as the company is, Shawinigan's management states shortly, "We can't spend too much money on research." By force of circumstances, the company was caused to "run scared" production-wise for the past 22 years. This energy and youthful vigor now is being directed into two areas, research and sales, which must be developed if the company's growth is to be maintained.

The company now has ample capacity for the first time because of a new plant in Trenton, Mich.

Since 1951 the growth of competition has been steady.

There are now 47 manufacturers in the United States of the four major types of polymer resins. Du Pont and others were making emulsions as early as 1944. In 1958, industry production of vinyl acetate was about 205 million lb. In 1953, production passed the 100-million-lb mark. Thus Shawinigan Resins is facing its future with a constantly increasing competitive market of which it will undoubtedly find its share growing, remaining constant, or shrinking.

To insure corporate growth, Shawinigan is applying hard and realistically the lessons learned and traditions developed in the past 22 years. One is to find and keep the people that it needs in research, production, and sales by constantly fostering personal development and creativity. A second is to keep a lean management, to quickly exploit results of company research. A third is to use the plus's of 50-50 ownership and control, drawing on the knowledge and experience of both parents.

Proper Education of Engineers Rests on Industry Support

DR. ROBERT LOBSTEIN
Chem-Tech Laboratories
Beverly Hills, Calif.

From the shores of the Blue Danube to the hills of Southern California is half a world away. But the move opened up a new world to Dr. Robert Lobstein, now associated with Chem-Tech Laboratories in Beverly Hills. For many years he was chief engineer and technical manager for Solvaywerke in Central Europe following his graduation from the Technical University of Vienna. Despite his heavy work schedule, he found time to continue his studies, and he received the degree of Doctor of Technical Science in 1930 from the Technical University of Prague. From 1941 to 1954 he was associated with chemical plants and engineering companies in the U.S. as project engineer, executive, and consultant. His professional activities include memberships in the Ingenieur & Architekten Verein (Engineers and Architects Association), Vienna; Verein Deutscher Ingenieure (Association of German Engineers), Bruenn, and the American Institute of Chemical Engineers.

MASS PRODUCTION of engineers in other countries points an indicting finger at the shortage of scientists — particularly competent engineers—in these United States, and has tossed into industry's lap the necessity of continuing education of engineers beyond college days.

Industry is accepting this challenge, and wants to take education of engineers partly into its own hands by training them for special industries or by upgrading technicians for engineering-type jobs. Regardless of the course pursued, it is an irrevocable fact that industry needs men who are so educated that they fit all jobs in the engineering field.

The engineer should be a man whose vision is not limited by "blindness," such as were used on horses at the turn of the century. The man who would contribute significantly to a particular field of science must be familiar with fields other than the one he wishes to make his own. The student of science should, in his earlier years, read, think, and study widely in various disciplines so that when he arrives at college he will have a real foundation for creativity in his chosen field.

Broad Education Keystone

No force can create creativity. Broad education, reading, thinking, talking intelligently can help but not create.

In general, creativity in the true sense is not dependent upon education, but a broad education gives the real foundation for creativity in the engineering field.

Industry must help institutions of higher learning in every way possible to bring forth more and better engineers. The role of a university, for example, is to develop engineering science, and its responsibility is to teach it. Industry's role is to develop the art, and industry should accept this responsibility.

But institutions of higher learning cannot fulfill their task if faculty members are not properly educated. We need teachers who have an awareness of scientific problems; who grasp every opportunity to encourage an inquisitive pupil toward further study and investigation; who know how to direct laboratory work and student projects; who have a desire to make science classes a stimulating part of every high school which offers a college preparatory curriculum. When we consider how inevitable science affects our national economy and national defense, mediocrity in science teaching is not only insupportable but perilous.

One of industry's prime tasks, then, is to make it possible for teachers to obtain help from all sides, particularly by increasing their knowledge of industry's newest developments. This is a much better way for industry to obtain competent technical personnel than to hire engineering students and train them in its own way to become specialists.

Support Needed

Universities cannot fulfill their duties if they do not receive industry's full support. This is especially true with regard to research. Industry must carry out considerable research to solve manufacturing problems. If the research area constitutes special activities which are more or less in the development field, then there is no question that industry must conduct this research in its own laboratories or engineering departments.

But as much as possible and as quickly as possible the results should be given to technical institutes so that faculty members will be able to teach the progress in technical science.

But if research surpasses the usual limits of general research; if it needs more than local attention, and if the research is of a pure or basic nature, then it should be turned over to an institution of higher learning.

In this way two purposes are achieved: First, universities are assisted in educating students in such a way that they become acquainted with the latest accomplishments of technical progress; second, there is security that research is in the best hands possible and results doubtless are the best that can be achieved.

It is possible that so-called business researches push aside pure or basic research because, to put it frankly, applied research brings money — a commodity institutions of higher learning need so badly.

It is therefore of vital importance that a way be found

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of processing problems

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AIR FIN COOLERS cut operating costs 74%

First large inland installation in North indicates trend toward air-cooled heat exchangers in areas where water is plentiful

GORDON WEYERMULLER,
Petrochemical Editor
with **JOHN W. THOMAS,**
Heat Exchange Engineer
The Standard Oil Company (Ohio)
Toledo, Ohio

New 60,000-bbl/day refinery of The Standard Oil Company (Ohio) at Toledo, which recently went on stream, uses 29 air-cooler bundles for 11 different services. This marks the first large inland installation of air coolers in the North. After a thorough consideration of all factors, it was shown that air coolers are the more economical for the services in which they are used.

In the past it has been considered that water-cooled exchangers were more economical where water was available. Hence, practically all large installations of air exchangers in the United States have been in the Southwest or similar areas where water is scarce.

Fallacy in the previous thinking on air cooling versus water cooling in the North is that all factors were not considered. If only the initial cost of heat exchangers is considered, water coolers usually appear to be the better choice. However, with water cooling, additional cooling tower capacity would have been required at Sohio.

In place of added cooling tower capacity, more water could have been brought in from Lake Erie. However, for

this a 7200' line would have been required, which would have been even more expensive than added cooling tower capacity. More piping and pumps would also have been needed. Disposal of waste water is also a problem in some cases.

Big factor, however is that operating costs of the air coolers are considerably less than half. Although initial cost of air coolers was higher, this added investment will be paid off in 1½ years through reduced operating costs. Total estimated cost of water-cooled facilities for the 11 services was \$410,000. Cost for the air-cooling installation amounted to \$500,000. However, operating costs for the air-cooled units are \$65,500 less per year for the water coolers, a 74% saving.

Of course, each service must be judged by itself. Generally, high temperatures are most suitable for air cooling. Although the Toledo refinery uses air coolers for 11 services, water-cooled exchangers are used for other applications. One advantage of air coolers is that corrosion from water and fouling are eliminated.

Typical Services

Accompanying photographs show some of typical services where air coolers are used at Sohio. In one service, an air-cooler is used for cooling 28,-

000 lb/hr of vacuum tower bottoms from 680 to 450°F. The stream is very viscous, having a viscosity of 14.2 Centistokes at 450°F. Exchanger is designed for air at 95°F.

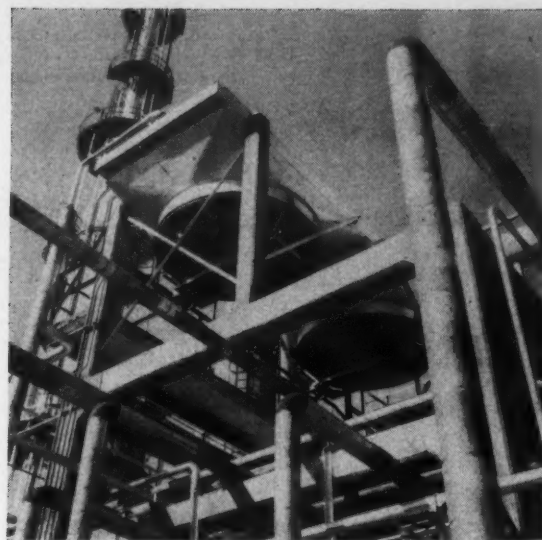
Another group of two air-cooler bundles cools 144,000 lb/hr of heavy reformat from 320 to 140°F. Two other bundles handle overhead from a reformat splitter, serving as condensers. They lower temperature of 78,000 lb/hr from 245 to 157°F. A one-bundle unit cools 75,000 lb/hr of lean oil from 317 to 140°F.

Nearly all of air exchangers at Sohio are installed in air above other operating equipment, minimizing ground area requirements.

Construction of Exchangers

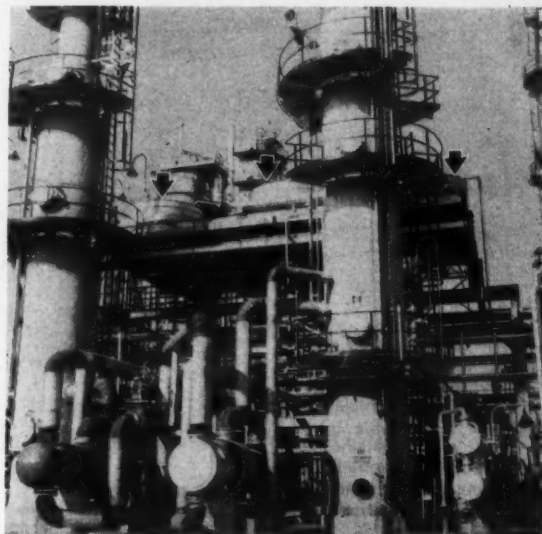
Air exchangers consist essentially of a large fan placed above a bundle of Hy-Fin tubes through which the product flows — both being enclosed as shown in photos. At Sohio the tubes are bimetal — a 1" or 1½" OD steel tube in-

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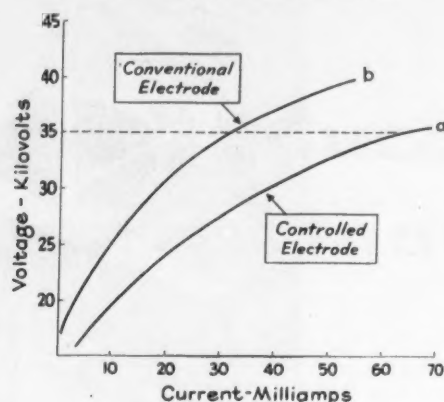
Air coolers are located above other equipment where they do not require ground room

Photos by CP Staff



Arrows indicate three air-cooled exchangers at Sohio. Three more units are behind them

Efficiency of Koronamax electrode is shown here. At 35 kv it delivers over 60 milliamps, compared to just over 30 for conventional electrode

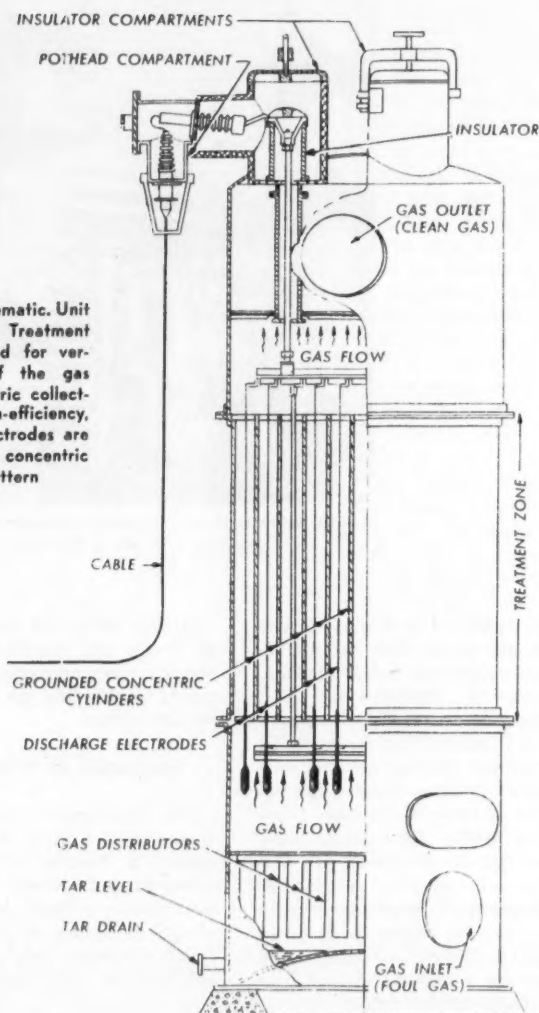


When it comes to discoloring naphthalene or ammonium sulfate, a little tar goes a long way. In American Steel & Wire's coal chemicals dept., impingement separators have been replaced by electrostatic precipitators that provide . . .

TOP EFFICIENCY DETARRING OF COKE OVEN GAS

THEODORE W. WETT, Associate Editor
with JOHN W. HARTER, Supt., Coal Chemicals Dept.
American Steel and Wire Div., U.S. Steel Corp., Cleveland, Ohio

Precipitator schematic. Unit is cylindrical. Treatment zone is arranged for vertical upflow of the gas through concentric collecting plates. High-efficiency, barbed-wire electrodes are arranged in a concentric circular pattern



PROBLEM: Tar carryover was too much the rule in coke oven gas treatment at American Steel & Wire's Cleveland, Ohio, plant. Impingement type separators did not remove sufficient quantities of tar to be effective. Naphthalene, which is very sensitive to tar discoloration, was running orange to a dark brown.

From coking ovens, gas was passed first through primary coolers where temperature was dropped from 85 to 30°C. Here, main portion of tar (about 95%) was precipitated. Gas then went through impingement separators intended to remove remaining tar before it was treated in auto absorbers by a sulfuric acid spray. Sulfuric acid formed ammonium sulfate with ammonia in gas stream. Sulfate was separated and dried.

Stream from absorbers was cooled further to precipitate naphthalene. Remaining gas was then further processed to obtain coke oven light oil.

In addition to darkening the naphthalene, tar passing

through absorbers also discolored the sulfate. With growing competition for ammonium sulfate customers being evidenced by sulfate produced from petroleum sources, production of as white a product as possible was imperative.

Solution: In October 1958, two electrostatic precipitators replaced impingement separators in coke oven gas treatment system as detarrers. These are all-steel units. Shell is a vertical cylinder, with dished heads forming top and bottom of unit.

Gas enters a distribution chamber at bottom, through a 36" side inlet connection, and flows upward through the 10'-long precipitation zone. Cleaned gas flows through an outlet distributor baffle to 36" outlet connection.

Precipitation zone is divided into parallel annular gas passages or lanes bonded by concentric cylindrical collecting plates. Discharge electrodes are equally spaced (about 6" apart) around circular center

NEW SOLUTIONS

of processing problems

line of each annular gas passage. They are suspended from a supporting grid above precipitation zone. Guided tension weights keep discharge electrode system in proper position and alignment. System is suspended from three insulators mounted on top of each unit.

Suspended particles of tar, oil, and water fog are precipitated from gas stream. They coalesce on electrode surfaces and flow down by gravity into bottom of unit and out through a hydrostatic seal into collecting system.

Power for precipitators is supplied by a 30-kva vacuum tube rectifier unit. Automatic power regulator supplies half-wave rectified current to each unit. Power is varied automatically to maintain optimum conditions in units at all times.

Precipitators at American are among first installed on this type of service with barbed-wire electrodes. Known as Koronamax, electrodes improve efficiency of units by controlling corona discharge. By proper spacing of barbs, complete control is achieved throughout precipitator. Efficiency ratio (amount of current produced in electrodes per given quantity of input power) is greatly increased.

This advance in electrode design permits units to be designed smaller than conventional ones would need to be for given load and gas volume. Thus initial cost is reduced, in addition to obtaining more efficient, trouble-free operation.

Suspending insulators are protected from entrained materials by circulating clean gas at positive pressure over

all insulator surfaces. They are kept dry by electric resistance heaters which maintain a safe differential between insulator surface temperatures and dew point of surrounding gas. This greatly extends insulator life since dirt and moisture are an insulator's worst enemies. Often, if this protection is not provided or is inadequate, an insulator will shatter completely in a very short time.

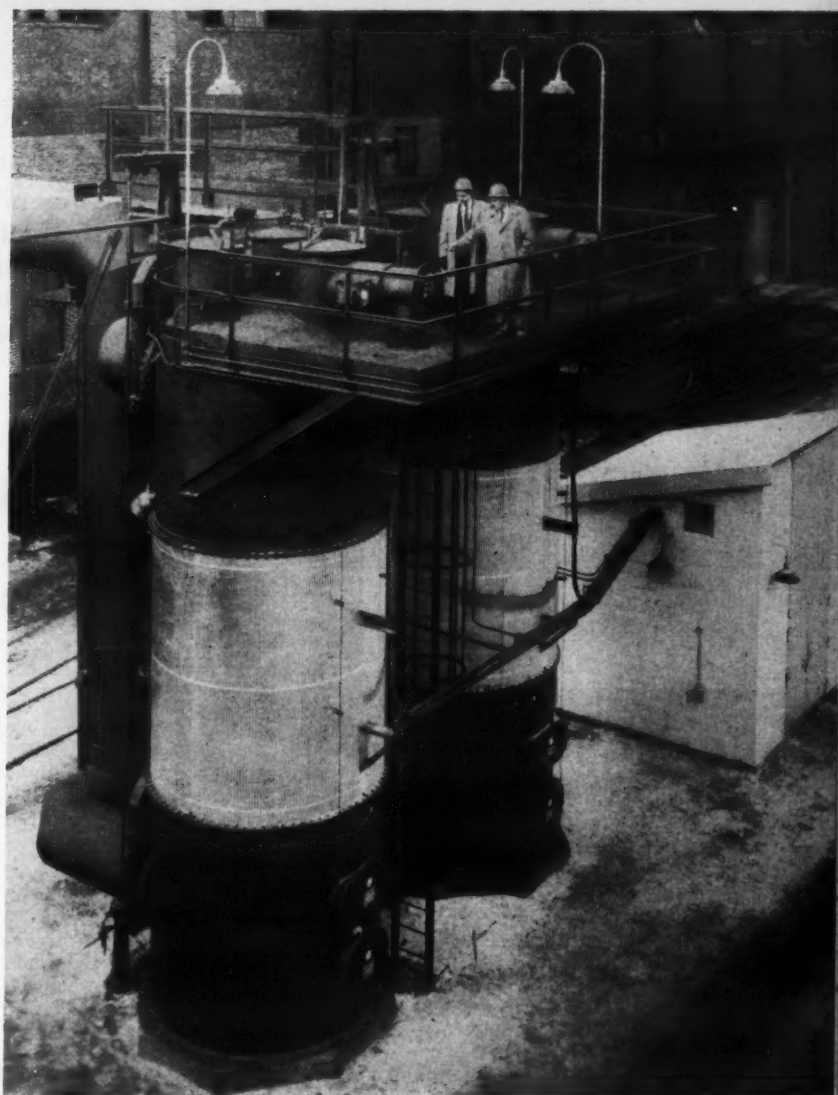
Results: Detarrers operate in parallel, each designed to treat 14,950 cfm of gas saturated at about 30°C. Based on an inlet loading of 0.35 grains per cubic foot, equipment is guaranteed to remove 96% of all particulate matter. Assuming 95% of tar has been removed by initial cooling, this represents a total removal of better than 99.9%. Since any remaining matter includes some moisture and oil, tar removal can be considered complete.

Most immediate visual result of precipitator's action has been a marked improvement in naphthalene color. Precipitated naphthalene is now white, in contrast to dark brown color formerly obtained.

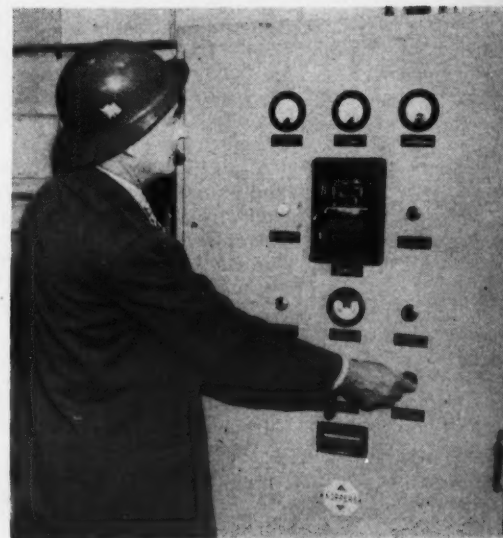
It is anticipated that there will be a corresponding improvement in ammonium sulfate produced, thereby reinforcing its competitive position. Greater recovery of both naphthalene and sulfate is expected.

(Electrostatic precipitators were manufactured and installed by Metal Products Division, Koppers Company, Incorporated, Baltimore 3, Maryland.)

Check 3570 opposite last page.



Department superintendent John Harter here indicates to W. Rastello, Works Supervisor, one of precipitator's insulator housings and power lead. Units each handle 14,950 cfm of gas at a loading of 0.35 gr/cu ft



Power pack control panel. Automatic power regulator maintains optimum operating conditions in precipitators. John Harter checks power setting

As with most chemical plants, more and more paper mills are eyeing continuous processing techniques. Designed for low operating costs and high yields, Swedish-developed Kamyr digester system is proving itself at Lincoln, Maine, mill. First of its kind in the United States, installation successfully performs . . .

CONTINUOUS PULPING OF HARDWOOD

TED F. MEINHOLD, Associate Editor
with **FRANK A. KNIGHT**
Production Manager
Eastern Corporation

CONTINUOUS pulping, with its big advantages of lower operating costs and higher yields of uniform pulp, has succeeded in gaining a strong foothold in the U.S. paper industry. Latest firm to swing over from batch process is Eastern Corporation, incorporating a continuous system in its new \$11-million plant at Lincoln, Maine.

Started only a few months ago, the mill has a capacity of about 175 tons pulp per day, providing Eastern with its own source of sulfate pulp for manufacturing its lines of fine business paper.

Designed for compactness and minimum labor requirements, plant is first in North America to use a Kamyr continuous digester system for hardwood kraft pulping. The Kamyr process was originally developed in Sweden and is available in U.S. on a license basis. It has also found use in a number of other countries throughout the world.

The Eastern installation is the fourth now operating in the U.S., but as mentioned above, the first designed primarily for processing hard-

wood. Other units currently handling softwoods are located in mills owned by Weyerhaeuser Timber, International Paper, and Gulf States Paper Company.

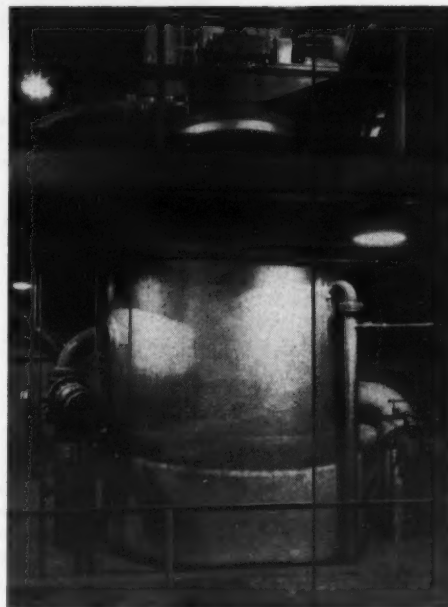
Digester System

The continuous digester system at Eastern has an estimated maximum capacity of

200 tons hardwood per day. Basic rating, in terms of softwood, is 150 tons.

First unit in the system is a large cylindrical chip tank having cone-shaped top and bottom. Chips from storage silos are fed to it continuously by a conveyor. Tank serves as feed tank for chip preheater, a 58'-diam by 25'-long horizontal unit.

Chips enter at one end of preheater through rotary-type feeder. Moving through unit by means of a 45"-diam helical screw conveyor, chips are exposed to 15-20 psi steam. In addition to preheating chips, steam also removes air and turpentine. Upon reaching opposite end of vessel, chips drop into chute, ready to enter top of digester.



Top of 74'-high vertical digester

Photo courtesy Paper Trade Journal



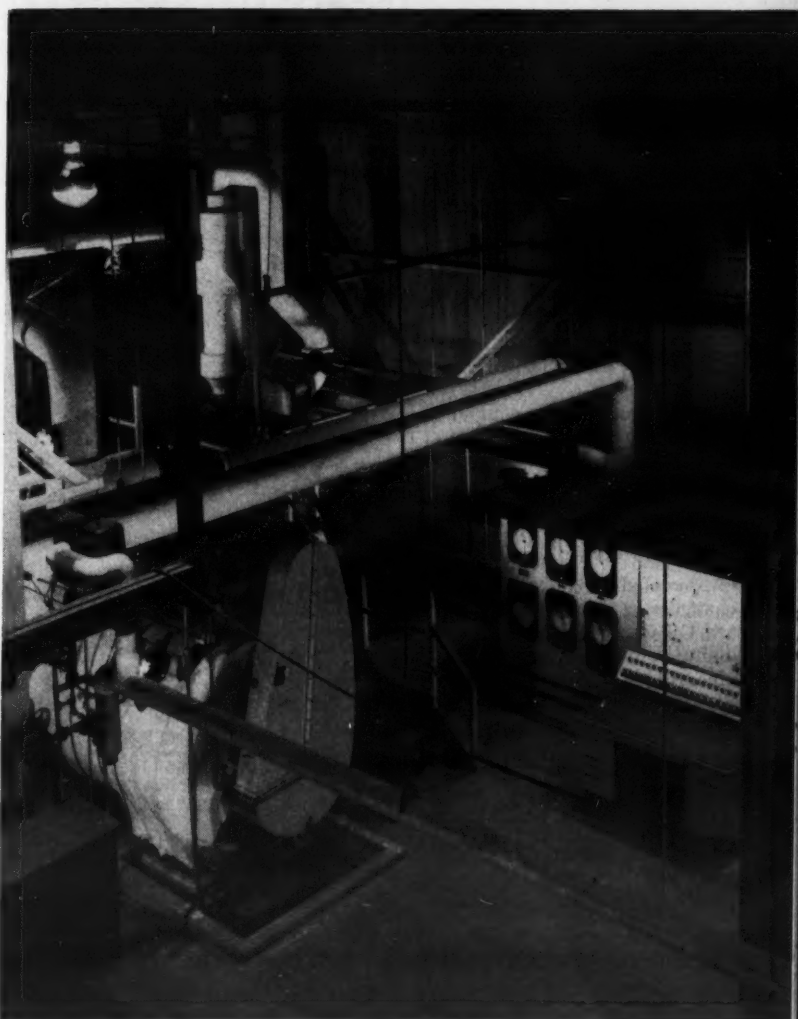
Large chip tank serves as feed unit for chip preheater

Photo courtesy Paper Trade Journal

Lincoln, Maine, mill of Eastern Corporation



Kamyr continuous digester operating panel. Low-pressure chip steaming vessel can be seen at left



Actual feeding is accomplished by a high-pressure rotary feeder. Chips are mixed with recirculated pulping liquor as they pass through feeder and into digester. Operating at 165 psi, digester is a tall vertical unit measuring 74' high. Diameter at base is 10'. Constructed of 2"-thick, mild-steel boiler plate, unit has internal strainer plates at top through which the conveying liquor passes. Rotating scraper helps keep the plates clean.

Fresh pulping liquor also enters top of digester. Flowing down through unit by gravity, the chip-liquor mixture is gradually heated from 230°F at top of digester to 340°F at bottom. Two indirect heating and circulation systems maintain uniform temperature zones about $\frac{1}{2}$ and $\frac{2}{3}$ of the way down the vessel.

Hold-up time is approximately $3\frac{1}{2}$ hours. Cooked product is discharged from bottom of digester through disc-type strainer. Unit separates liquor from cooked chips so that liquor can be pumped back into bottom of digester to insure adequate dilution and trouble-free draw-off. Chips pass on to a blowdown tank. Flashed steam at 15-20 psi is returned to the steam vessel preheating incoming chips.

Blow tank holds about 12 minutes run of pulp at 12 percent solids consistency and 15 psi back pressure. Prior to discharge from tank, consistency is cut to $3\frac{1}{2}$ percent by automatic dilution with black liquor. Stock is then sent through two vibratory de-knotters, is further diluted to 1 percent, and is ready for additional processing into high quality sulfate pulp.

Steam Needs Cut

Since the entire pulping operation is continuous, steam demands are more uniform and less than those required in conventional batch pulping operations. Steady operation also means longer equipment life, since thermal shock, believed to be one of the main causes of corrosion in batch-type digesters, is minimized.

At Eastern, 600-psi steam is produced by two boilers, a 69,100 lb/hr black liquor recovery unit and a 70,000 lb/hr oil-fired boiler. In addition, there are a few 175-psi output pressure, oil-fired units for emergency service.

Black liquor recovery unit burns about 20,400 lb of salt-cake-free black liquor solids per hr. The recovery system features a venturi scrubber and cyclone separator for recovering chemicals (dry solids) in gases leaving furnace, and a contact evaporation unit for concentrating liquor solids.

Initial cost of a continuous digester is about the same as for a batch-type unit in small plants. In larger plants, those handling over 375 tons pulp per day, costs are appreciably less. Installing a 175-ton/day unit costs approximately \$700,000. A 300-ton/day plant runs close to \$1 million.

(Pulp mill was designed and constructed by The Rust Engineering Company, 930 Fort Duquesne Boulevard, Pittsburgh 22, Pennsylvania.)

Check 3571 opposite last page.

(Further information about Kamyr continuous pulp digestion system may be obtained from Kamyr, Inc., Hudson Falls, New York.)

Check 3572 opposite last page.

Air Fin Coolers

From page 29

side an aluminum tube. Fins $\frac{5}{8}$ " high are extruded from exterior walls of the outer aluminum tubes. Hence, fins cannot become detached because of vibration, shock, or pressure variations. The ratio of outside surface area of tube to inside is about 17:1.

Fan pitch can be varied to regulate air flow on all of exchangers. This is done manually on all of units except one. On this one unit, where it is desirable to maintain the temperature of overflow from a crude tower at 295°F, pitch of fan is adjusted automatically according to temperature of crude being cooled.

Foreign Installations

Although up to now large installations of air-cooled exchangers have not been made in the United States in areas where water is plentiful, air-cooled exchangers are used widely in European countries. Recently a large petroleum company on the East Coast announced that air fin coolers will be used in new refineries being built in Wales, Holland, and Norway. This is the first time air coolers have been used in new refineries built by company.

Engineers of this company estimate that savings of several million dollars in investment costs will be made in these refineries through the use of air coolers. Need for water, sewers will be less.

(Air-cooled finned heat exchangers in use at The Standard Oil Company (Ohio) were manufactured by Hudson Engineering Corp., 2711 Danville St., Houston, Texas.)

Check 3573 opposite last page.

(Finned tube is based on patents of Wolverine Tube, div. of Calumet & Hecla, Inc., 17200 Southfield Rd., Allen Park, Mich.)

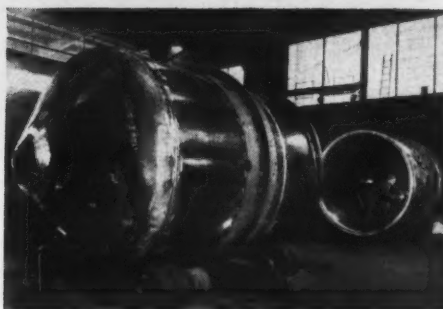
Check 3574 opposite last page.

(New Sohio refinery was designed and built by The M. W. Kellogg Co., 711 Third Ave., New York 17, N. Y.)

Again-ADSCO

mammoth heat





▲ GRINDING DOWN ONE OF THE WELDS made in the vapor condenser shell of Revere Herculoy. Completed unit measured 90" x 26' with a total weight of 100,000 lbs. Units were fabricated by ADSCO DIVISION, YUBA CONSOLIDATED INDUSTRIES, INC., Buffalo, N. Y.

▲ TUBE BUNDLE of 2,150 Revere Copper Tubes, each 3/4" in diameter, rolled into 4,300 Tube Sheet holes, with a total weight of 26 tons and producing a surface of 14,000 sq. ft. To prevent damage during shipment wax was poured around the unsupported rounded ends of the tube bundle, which, when hardened, held the ends firmly in place. After the exchanger was placed into position the wax was blown out with steam.

exchangers contain REVERE METALS

105,000 lbs. of Revere Copper Tube and 50,000 lbs. of Revere Herculoy Plates are used in two 50-ton units fabricated for National Aniline Division, Allied Chemical & Dye Corp., by Adscio Division, Yuba Consolidated Industries, Inc.

These two units are duplicates of the two constructed for National Aniline Division, Allied Chemical & Dye Corp. in 1953.

In addition to their huge size and weight it is interesting to note that the tube bundle was constructed of copper tube because of its high thermal conductivity and corrosive-resisting characteristics, and the shell made of Herculoy because of the accuracy and speed with which it can be welded, its great strength and corrosion-resistant features.

Herculoy is Revere's silicon bronze with the tensile strength of mild steel and

corrosion-resistant qualities of copper, and is a natural for shells such as these. Its characteristics also make it the economical answer for tube sheets and plates.

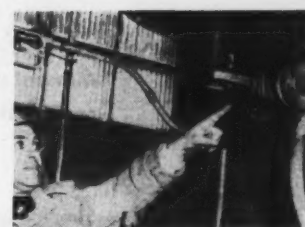
It is jobs such as this that have given Revere the background of experience that can prove valuable in the solution of your particular metals problem. And is still another example of Revere's Technical Advisory Service helping to select the right metal, in the right form, to do the best possible job with the greatest economy . . . whether it be copper, brass, aluminum, or any one of their alloys.

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Fire-protection gate valve of stainless steel guards flammable chemicals

Flow of corrosive flammables to fire areas is prevented at American Cyanamid Company's Warner's plant at Linden, N.J. by stainless steel, fire-protection valves. Units are used in lines below storage tanks containing ethyl mercaptan, ethyl alcohol, methanol, acrylonitrile, and methyl ethyl ketone.

Essentially a modified bolted-bonnet gate valve, exterior springs snap valve shut when a fusible link reaches melting temperature of 160°F. Fabricated of 316 stainless steel, valves and springs resist both exterior and interior corrosion; can be used at pumping pressures up to 150 psi.

A special design feature is rotating double disc assembly which maintains tight seal even when valve body distorts because of heat. Company and manufacturer report absence of problems since initial installations, and the gate-type cut-off valves are now replacing counterweights and bellows valves throughout plant. Replacing fusible link, held in place by two pins, is easy during the once-a-year testing period.

Space and position no longer are limiting factors in strategic use of valves because new ones are compact and have no counterweights. Valve can be installed in any position in cramped or highly inaccessible plant locations.

Complete fire-protection valve is said to be competitive in price with those made of carbon steel.

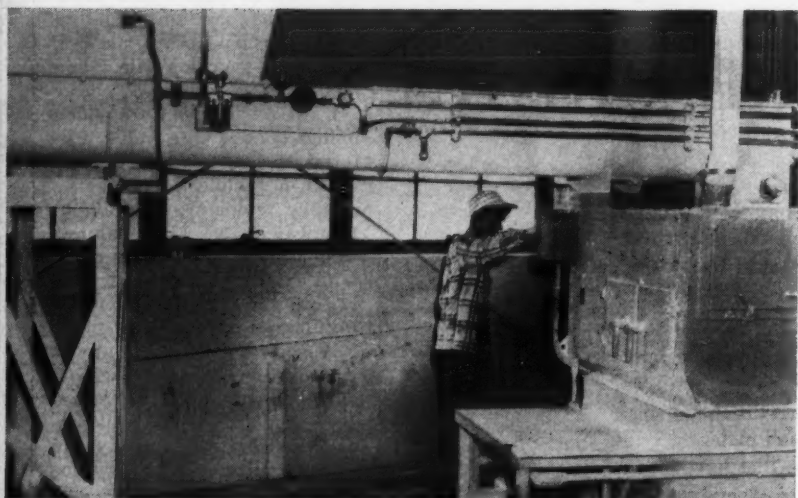
(Stainless steel valves are produced by Cooper Alloy Corp., 100 Bloy St., Hillside 5, New Jersey.)

Check 3576 opposite last page.

Check 3575 opposite last page

Manual unloading of dusty, spray-dried material was
costly, time-consuming job. Shift to automatic equipment . . .

Slashes clay handling time 65%, eliminates material loss



Surge hopper (left) delivers clay into screw conveyor (center) for discharge into scale (right), where material is automatically weighed and discharged



After leaving scale, clay falls through another hopper into reversible screw conveyor which feeds into one of two slurry tanks (foreground)

PROBLEM: Unloading bags of spray-dried predispersed clay was a time-consuming job, taking four men a full day to empty a freight car of six hundred 100-lb bags at the Johnsonburg, Pa., paper mill of New York and Pennsylvania Co. After bags were unloaded, they had to be opened and hand-dumped into slurry tanks for mixing with water.

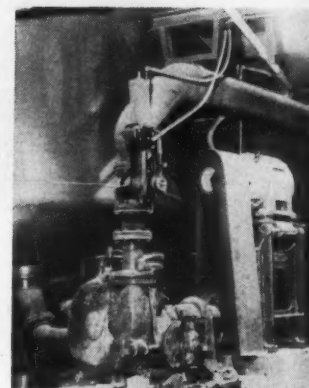
Bags often were mishandled, resulting in loss of clay and creating serious dust problem. Possibility of contamination always was present. Difficulties in handling were encountered because clay is somewhat cohesive as well as flushy in nature. ("Flushy" materials are defined as materials which, by their nature, tend to flow irregularly—with sudden increases in volume—which can cause bad overflow problems.)

Compounding the difficulties was the fact that increased industry demands for coated stock resulted in need for quantities of coating preparation in excess of what manual clay handling could meet.

Solution: Completely automatic clay preparation tower, with pneumatic bulk unloading, and weighing equipment was constructed alongside one of many railroad sidings at plant site. One man operates master control panel.

The pneumatic system consists of recently developed dual-feed unloader, conveyor, and filter.

On dual feeder are two air-



Final slurry is pumped from bottom of mixing tanks through pipe leading off at right to storage. Device in line is air-operated plug cock with automatic shut-off valve which opens when pump starts and closes when pump stops

locks, each of which is affixed directly beneath outlets in covered hopper cars which hold 50 tons of clay divided into two sections.

Unloader is attached to enterprise gates at bottom of car, and air and conveying line hoses are hooked up to car and unloader. After car outlets are opened, blower is started. Material drops by gravity through gates into unloader, then into conveying system, which consists of two 5" flexible hoses connecting into main 8" conveying line.

Clay is moved through conveyor system to filter on top floor of preparation building, 50 feet distant. There clay is separated from conveying air. Latter is piped to exhauster which provides both activating air and vacuum for entire system.

Clay is discharged from filter into surge hopper through completely enclosed rotary airlock.

Screw conveyor, which delivers clay from surge hopper to scale was specially designed to meet requirements of job. Receiving end has gradually increasing pitch so material gets under way without plugging or arching. Special tube fitted midway in conveyor restricts tendency of clay to flush. Double flights in exit end deliver material quickly and in even stream to inlet chute of scale.

Scale itself has vibrators on weigh hopper which are actuated whenever discharge door is opened. This assures that all weighed material is effectively discharged from weighing hopper.

Door on weighing hopper is power-operated and brush-sealed so no material can escape during weighing operation. Clay is discharged quickly and completely — in 250-lb batches — when hopper door is opened after each weighing.

Fed to Slurry Tanks

Reversible screw conveyor receives scale discharge and feeds it to one of two mixing or slurry tanks. Scale discharge is controlled by electric counter set for required number of discharges. Scale automatically stops upon completion of specified number.

Whenever surge hopper fills, feeding system is shut down to prevent plugging the feeding supply arrangement.

Man at master panel also controls slurry preparation and mixing, which begins with metering purified water into twin slurry tanks. Pre-weighed clay is added until complete batch consists of 25,000 lb.

Slurry is mixed by propeller-agitator in side-baffled tank. Mixing full batch to slurry consisting of 70 percent solids takes about one-half hour, after which slurry is automatically withdrawn from tank bottom and pumped approximately 100 ft to storage.

Results: One man at master control of pneumatic system can unload 25 tons of bulk clay an hour, resulting in 65 percent slash in clay handling time. Entire operation, allow-



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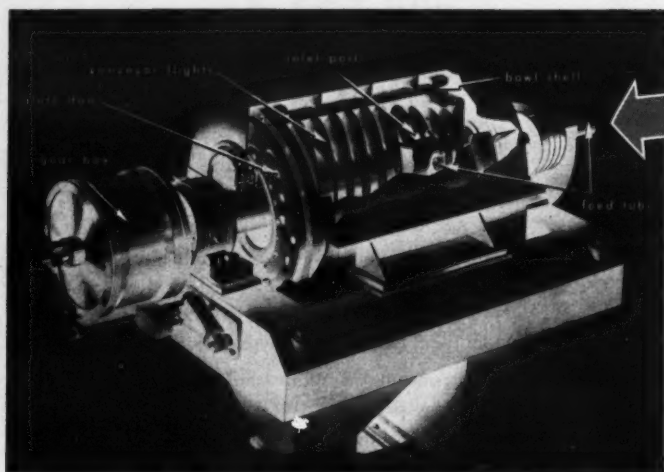
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Check 3577 opposite last page

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and 7 reasons why
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Continuous solids discharge

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① SIX SIZESWIDEST CAPACITY RANGE

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② SLURRIES OF ½% or less to 50% or more solids concentration can be clarified or dewatered continuously with high efficiency. Moistures as low as 1% can be obtained depending upon characteristics of the feed slurry.

③ AMORPHOUS and CRYSTALLINE SOLIDS in the size range from a few microns up to relatively large particles are being processed efficiently.

④ BROAD RANGE OF MATERIALS HANDLED—from basic inorganic and organic chemicals such

as alkali, reaction chemicals and polymerized plastics, to fruit and vegetable juices, edible and inedible tallow and lard, to high energy fuel components.

⑤ MODELS FOR PRESSURE OPERATION to 150 psi, as required.

⑥ HIGH CENTRIFUGAL FORCE (to 3200 x gravity) effects greater separating capacity in a given area than is possible with lower centrifugal force.

⑦ TESTS, PILOT PLANT OPERATIONS, and small production on the P-600 Super-D-Canter—performance can be scaled up directly to the larger models.

NEW SOLUTIONS

ing time for each phase of process from dry clay in cars to mixed slurry in storage tank, takes no more than four hours.

New system also has eliminated loss of clay, reduced dust problem, provided contamination-free operation, and improved employee relations at the plant.

Conveyor system similar to one described herein also is used by company at its Lock Haven mill to handle clay requirements.

(Pneumatic unloader, Airveyor, and Airveyor filter are designed, engineered and built by Fuller Co., Subs. of General American Transportation Corp., Catasauqua, Pa.)

Check 3579 opposite last page.

(Class 50 Scale and special screw conveyor is product of Richardson Scale Co., Clifton, N. J.)

Check 3580 opposite last page.

At International Salt rubber-lined tank lasts much longer

Salt-sulfuric acid solution handled by vessel

Problem: At the Ludlowville, New York, refinery of International Salt Company, a steel tank used in process had a life of only one to two years. Tank was used for mixing service at a point where sulfuric acid is added to sodium chloride brine. Solution in tank had a pH ranging between 2.5 to 5.

Solution: In 1952 a rubber-lined tank was installed in refinery. Composition of rubber is one developed particularly for acid service.

Results: Rubber-lined tank has been in continuous service handling the corrosive mixture for the past six years. It is still in good condition, apparently having years of useful life remaining.

(Rubber lining for tank is product of Gates Rubber Co., 999 South Broadway, Denver 17, Colo.)

Check 3581 opposite last page.

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Check 3578 opposite last page

NEW SOLUTIONS
of processing problems

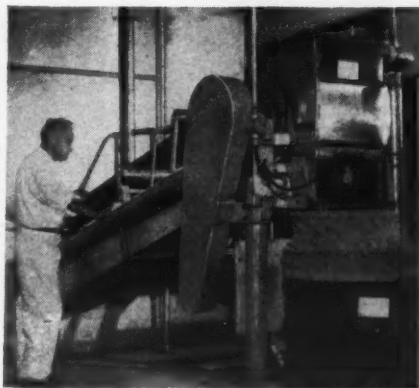
Equipment consists of 3 vibrating tiers mounted one above the other in a 3-deck formation. Feed enters at far end of top tier, drops down successively to third tier, and leaves through chute at lower left. System is located inside stainless-steel enclosure which prevents heat loss, product contamination



Handling heat-sensitive pharmaceutical tablet formulations, continuous granulation-drying system . . .

- combines 2 operations into 1
- cuts processing time over 50%

TED F. MEINHOLD, Associate Editor
with **RAY SWANSON**, Granulating Supervisor
Abbott Laboratories



CP Staff Photos

Coming out of dryer (rear), product is transferred by belt conveyor to 55 gal drums

Problem: Grinding and drying pharmaceutical tablet formulations was a laborious and time-consuming job at Abbott Laboratories, North Chicago, Illinois. Performed in conventional batch-type processing equipment, the operations involved considerable handling and transferring steps. Extreme care had to be taken to prevent heat damage, product contamination, and minimize product loss.

Over a dozen different formulations were involved, including Sucaryl® (cyclamate) sodium, phenobarbital, thiamine, nicotinic acid, and other drugs. These were made up in a large blender, passed through a mill, dried in a tray-type dryer, and then ground to final size (10-16 mesh) ready for tableting.

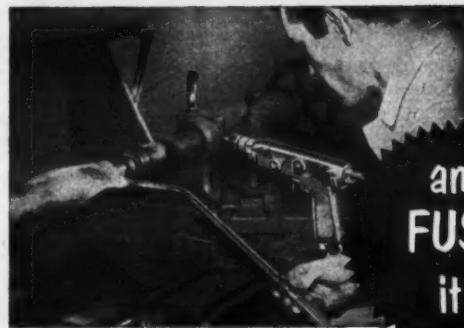
Batch sizes vary from 800 to 1500 lb. It would often take as much as three days to finish a batch. Big bottleneck was drying operation. Moisture had to be reduced from 17-24% to less than ½ of 1%. Conducted at 140°F, it took anywhere from

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FUSE
it!

WEAR

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Check 3582 opposite last page

16 to 48 hr to accomplish this in the dryer.

Solution: Company installed a continuous drying, cooling, and granulating system for the operation. Designed as a complete packaged unit, equipment is fully enclosed and occupies a space 30' long by 15' wide by 10' high.

System consists essentially of three 20'-long by 5'-wide, vibrating dryer tiers located one above the other, forming a three-deck arrangement. Crushers, granulators, and sizing screens are so positioned that grinding, drying, and sizing operations can be carried out continuously, without removing material.

Design conserves space and headroom and by-passes need for intermediate material handling equipment, storage, and labor. Heat losses are also eliminated and rigid process control is easily maintained.

Materials are moved along the solid plate stainless steel tiers by gentle low-frequency vibration. Tiers are heated from below by steam-heated air. Speed of travel and depth of material can be varied as required through the various processing zones. Automatic controls assure maintenance of proper conditions.

There is no serious falling or cascading of product or any rolling of particles on one another. Material does not cake and has uniform appearance.

Results: The continuous system has cut processing time at least 50%. Batches that used to take 2 or 3 days are now easily completed in 1 day. Combining the grinding and drying operations has simplified processing, reduced labor, and essentially eliminated product loss. Uniformity of product has improved and danger of product contamination due to excessive handling has been removed.

The drying bottleneck has also been solved. Holding time in the dryer is now only 12 to 14 minutes. Average feed rate is 300-400 lb per hr.

The yearly equipment utilization averages about 75% based on an 8-hr day. Maintenance has been negligible. Unit takes 40 minutes to heat up in the morning and 15

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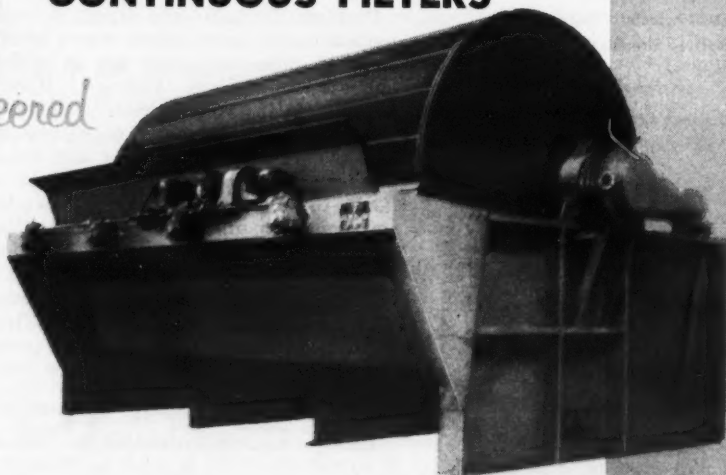


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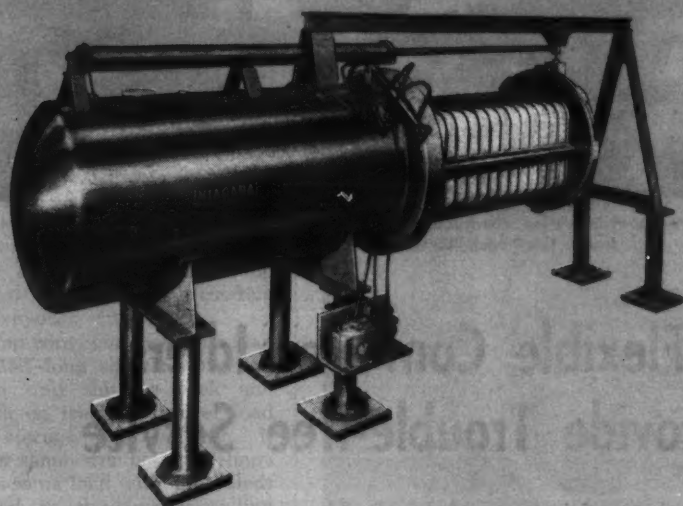
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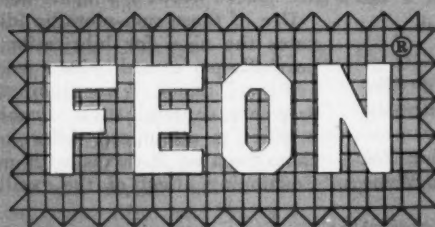
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minutes to shut down in the afternoon. Cleaning between batches requires 2 to 3 hours. Although this does not cause any problem when handling large batches, it is a handicap when small batches (less than 2 hr runs) are processed.

(Vibrating process equipment was installed by the Jeffrey Manufacturing Company, Columbus 16, Ohio.)

Check 3584 opposite last page.

Phenolic-type linings in drums halt attack of lithium bromide

Problem: Highly corrosive characteristics of lithium bromide, used in air conditioning systems, made it difficult for Foote Mineral Company to ship the chemical in conventional steel containers from its Exton, Pa., plant. Contents had



Pigmented phenolic-lined drum is filled with highly corrosive lithium bromide just before shipment

to be either kept from contacting the metal or it had to be contained in a vacuum. The latter method was economically impractical.

Solution: Drums with pigmented phenolic-type linings were obtained.

Drums, which are of 30-gal capacity, hold about 400 lb. Manufacturer guarantees no content loss for 3 months.

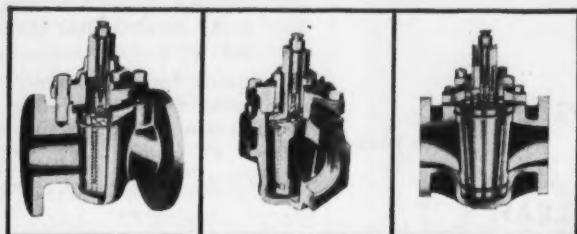
Results: Linings block chemical attack. Many drums, Foote reports, have held corrosive material longer than three months. Coverage is complete and uniform.

(Drums are manufactured by Container Div., Jones & Laughlin Steel Corp., 3 Gateway Center, Pittsburgh 30, Pa.)

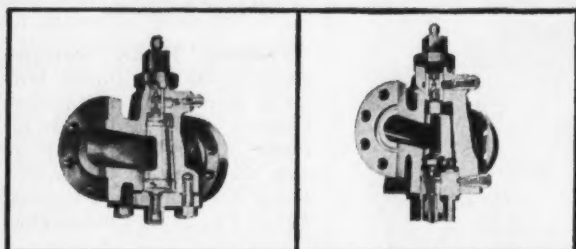
Check 3585 opposite last page.

Check 3583 opposite last page

What are your valve needs?
SPECIFY FROM
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COMPLETE VALVE LINE



For working pressures from 175-lb to 800-lb, Rockwell-Nordstrom valves are available in semi-steel and corrosion resisting alloys in sizes from 1" to 24".



For working pressure to 10,000-lb, Rockwell-Nordstrom Hypre-seal valves are available in steel and corrosion resisting metals in sizes to 30". Operated by wrench, gear or power actuators.



Rockwell-Nordstrom Multiport valves permit three and even four way control with one valve . . . ideal for batching, blending or relief service. See diagrams for a few of the possible flow arrangements.

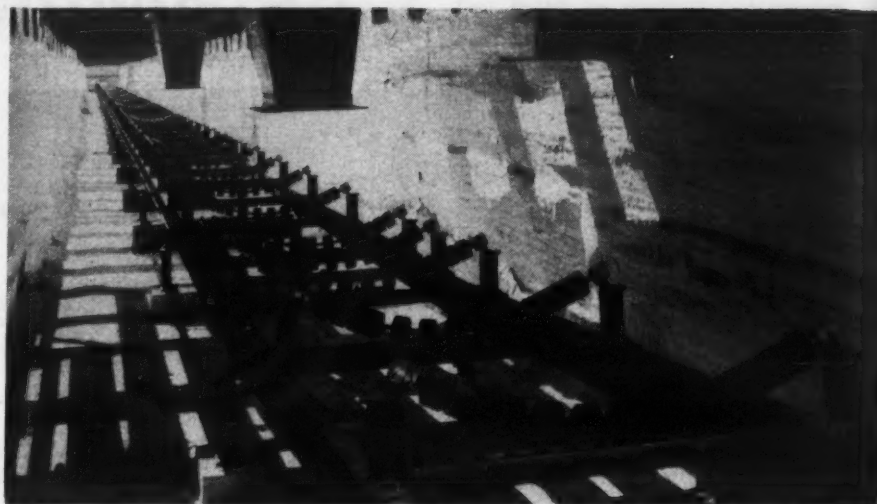
Rockwell-Nordstrom is the world's most complete line of lubricated plug valves, plug valve lubricants and operating accessories. Whatever your needs, you'll get better flow control at far lower cost when you specify from the Rockwell-Nordstrom line. Rockwell Manufacturing Co., Pittsburgh 8, Pa. Canadian Valve Licensee: Peacock Brothers Limited. Check No. 3586 on the reply slip in this magazine for free details.

ROCKWELL-Nordstrom VALVES

it's **ROCKWELL** 
MANUFACTURING COMPANY

Check 3586 opposite last page

NEW SOLUTIONS
of processing problems



Recovery conveyor during construction, showing neoprene idlers and conveyor frame. This trench-like area was cut from solid salt

Flexible Conveyor Idlers Provide Trouble-free Service

No lubrication needed for flexible neoprene units
used to continuously transfer salt and potash

GORDON WEYERMULLER, Associate Editor
with **L. W. FERRIS**, President
Bonneville, Ltd., Salt Lake City, Utah

Belt conveyors which utilize flexible idlers designed to withstand continuous service under severe conditions have provided trouble-free operation during 2½ years use at Bonneville, Ltd., near Wendover, Utah.

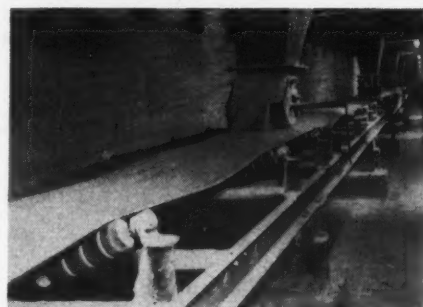
Plant uses five conveyors with a total length of 1112' for handling salt and potash at temperatures to 250°F. Longest of four conveyors is a 415' unit. Of the several hundred idlers in use on these conveyors, none have failed since installed in early 1956.

Construction of Idler

Idler consists of resilient neoprene discs molded to a neoprene-covered wire cable that is freely suspended from two sealed ball bearings. These bearings are mounted on stands about one foot above the channel frames or truss sections so that contamination from dust is less likely. There

are no bearings under the belt. Idlers are spaced about 4-6' apart along frames.

Use of these non-metallic idlers eliminates the need for lubrication, which is normally performed twice a week on conventional idlers. With elimination of oil or grease, contamination of rubber belt or product is minimized. Idler keeps itself clean because it flexes with every turn. Cushioning effect of the resilient idlers



Recovery conveyor during operation. Sealed idler bearings have needed no maintenance despite being covered with salt

CHEMICAL PROCESSING

is also expected to lengthen belt life.

For this installation a neoprene coating was applied to all idler brackets and exposed steel parts. Idler bearing cases were not coated since they are cadmium plated. Structural framework was painted with one coat of zinc chromate orange.

Slope Conveyor

In order of material flow in plant, outside slope conveyor is first. This unit is 295' long and uses a 24" belt. It is designed to handle 75 tons of material per hour with belt speed of 150 fpm. Maximum lift is 57'.

From slope conveyor, load goes to top conveyor inside building. This unit is 175' long and also uses a 24" belt. Quantity of material handled and speed is same as preceding conveyor.

Top conveyor transmits load to 152'-long shuttle conveyor. This unit shuttles back and forth on track to deliver load to storage bins beneath. It uses same size belt and handles same load with equivalent speed as the two preceding units.

Recovery Conveyor

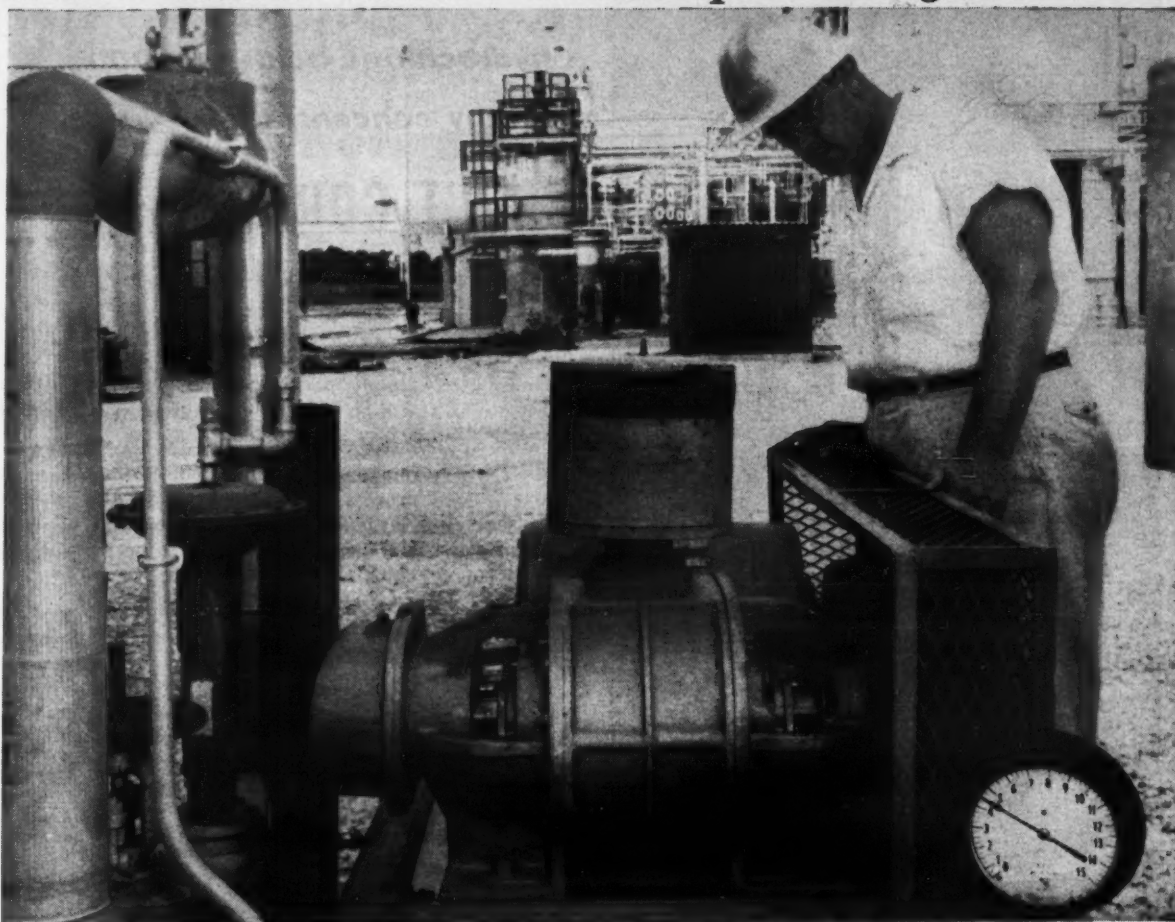
The 415'-long recovery conveyor uses a 30" belt. It takes material from storage bins, conveys it outside to waiting rail cars or trucks. Conveyor dumps material into a hopper, which loads a bucket elevator. This, in turn, raises material high enough so it can be loaded into chutes which feed cars or trucks. Slight incline at head of conveyor lifts load about 11'. Capacity is 125 tons/hr at 150 fpm.

Fifth conveyor is 75' long and uses a 24" belt. It takes material from outside storage bin to flotation mill on incline lift of 30'. It is designed to handle 80 tons of material per hour at 150 fpm.

(Limberoller idlers, truss sections, and channel frames are products of Joy Manufacturing Company, Oliver Bldg., Pittsburgh 22, Pa.)

Check 3587 opposite last page.

where blower failure would spell Danger



Sutorbilt blower at Polymer Chemicals Division plant in Baton Rouge, La. Blower is required at a critical phase of catalyst activation in a new Phillips-type polymerization process.

W. R. GRACE DEPENDS ON A SUTORBILT ROTARY, POSITIVE-PRESSURE BLOWER

At W. R. Grace & Co.'s new Polymer Chemical Division, the catalyst for a new, high-density polyolefin production process must be protected in a pressurized air stream. A doubly-dependable Sutorbilt rotary positive-pressure blower was selected for these three important reasons:

1. Contamination must be avoided

Long-lasting, air-tight, Teflon seals and lack of lubrication in compression chamber prevent air contamination in a Sutorbilt blower.

2. Breakdowns would be dangerous

Simple, rugged, precision construction (only rotors

and bearings move) means reliable service. Unit chosen by Grace has been in continuous operation for well over a year without repairs.

3. Pressure must be positive, constant

The two, counter-rotating "figure eight" Sutorbilt impellers produce a positive-pressure, metered air supply.

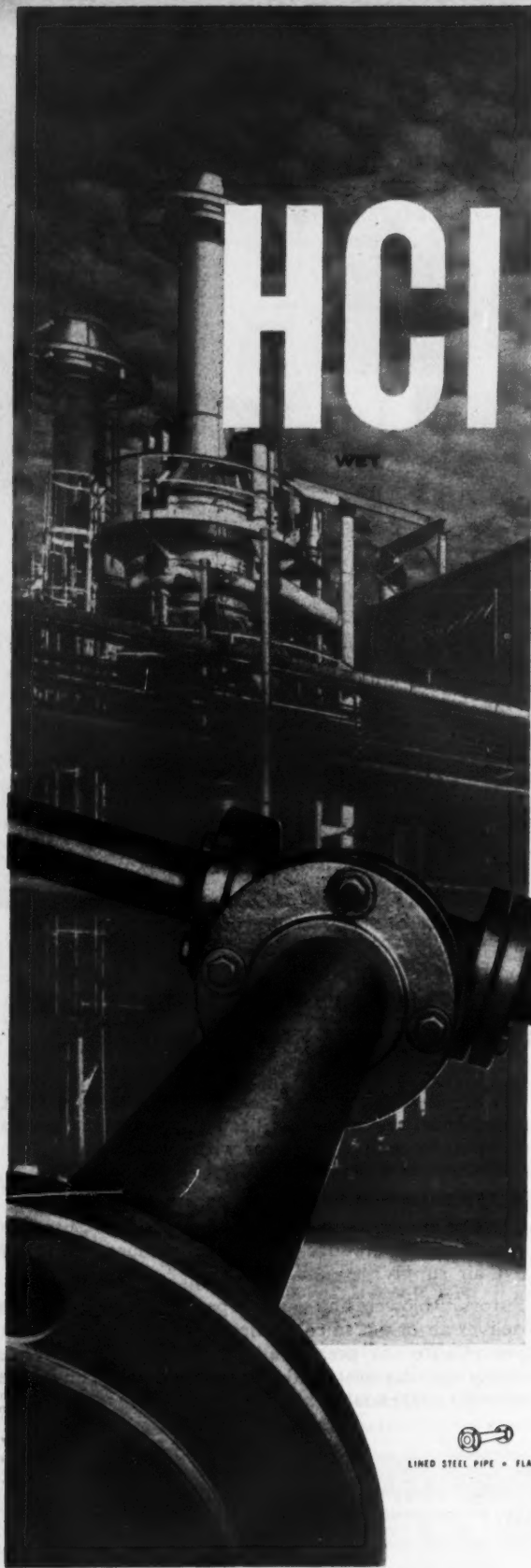
Sutorbilt blowers and gas pumps are precision-built to deliver air or gas in capacities up to 20,000 cubic feet per minute—at pressures up to 10 pounds. Write today for complete, illustrated literature on these efficient, dependable blowers.

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S-16



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SUBSIDIARY OF FULLER COMPANY • CATASAUQUA, PA.

Check 3588 opposite last page



**hydrochloric acid—to 500°F,
in any concentration,**

CAN'T CORRODE FLUOROFLEX®-T PIPE

Lining is completely inert to all corrosives. It's made of Fluoroflex-T, a high density, non-porous compound* of virgin Teflon.

Liner and housing are in thermal equilibrium through an exclusive process developed by Resistoflex. It compensates for thermal expansion differential between the Teflon and the pipe housing, eliminating fatigue collapse, and cracking at the flange.

Saves \$60,000 monthly at one chemical processing plant. Frequent piping failures cost that much in excessive maintenance and product loss. An exhaustive search among all types of piping uncovered only one system that could handle the mixture of 25% hydrochloric acid and organic solvents at 300°F and 100 psi without difficulty—Fluoroflex-T Type S piping. With over 1500 feet and 400 fittings now in service—some for more than 18 months—there have been *no failures*.

Fluoroflex-T Type S piping systems can handle the toughest problems of corrosion, erosion and contamination for you, too, with complete safety. Send for Bulletin TS-1A. Dept. 200, RESISTOFLEX CORPORATION, Roseland, N. J. Other Plants: Burbank, Cal., Dallas, Tex.

© Fluoroflex is a Resistoflex trademark, reg., U. S. pat. off.
© Teflon is DuPont's trademark for TFE fluorocarbon resins

*** Pat. No. 2,752,637**

liner of TEFLON®
in thermal equilibrium with housing

RESISTOFLEX

Complete systems for corrosive service



LINED STEEL PIPE • FLANGED FLEXIBLE HOSE • BELLOWES • ELBOWS • TEES • REDUCERS • DIP PIPES & SPARGERS • LAMINATED PIPE

NEW SOLUTIONS

**Silicone rectifier works
in parallel with rotary
and mechanical units**

Problem: Hercules Powder Company needed additional amperage for chlorine producing electrolytic cells at the Hopewell, Virginia, plant. While investigation seemed to indicate that a semi-conductor metallic rectifier would be best, it was not desirable to retire existing conversion equipment.

Manufacturers were contacted to determine practicality of operating two rotary converters and one mechanical



Portion of semi-conductor rectifier open for inspection. Unit operates in parallel with mechanical rectifying equipment

rectifier in parallel with semi-conductor unit. It was believed that the metallic rectifiers built up to that time might not operate successfully in such a setup.

Solution: In November 1957, a 3000-kw, 10,000-amp, 300-volt, DC silicon rectifier was put in service at Hopewell. Among features of unit was a protective means which made it possible to operate semi-conductor unit in parallel with all existing conversion equipment.

Unitron rectifier consists of two 5000-amp, 300-volt, DC, 6-phase, bridge-connected rectifier sections fed from two separate secondary windings of a common transformer. One winding is delta connected, the other wye connected resulting in 12-phase operation. Complete unit has 480 rectifying cells. Cells are water cooled in such a manner that liquid system is not disturbed when replacing a defective cell.

As semi-conductor rectifier operates on a common DC bus with two rotary converters

Check 3589 opposite last page

CHEMICAL PROCESSING

and one mechanical rectifier, a bus fault could cause loss of all cells and their fuses. To protect against such an eventuality, a magnetic core of square loop material is installed in each of two 5000-amp, positive DC leads. When a fault occurs, flux change is detected by a trip winding on the core causing operation of short circuiter on the AC side of the semi-conductor rectifier. This unit creates a bolted short circuit in 40 micro-seconds.

Each rectifying cell is protected by a high-speed Amp-Trap fuse, self indicating. Fuse protecting a faulted cell will blow but no other cells will be affected. Unit will continue to operate until a convenient shutdown can be arranged.

Rectifiers and converters are used to provide direct current to electrolytic cells on a 20,000-amp bus.

Results: Semi-conductor rectifier has operated at 10,000 amp when other equipment is out of service. It has operated continuously in parallel with a 5000-amp mechanical rectifier and one or two 5000-amp rotary converters as required. It has continued to operate one section when the other tripped out and has been unharmed when a backfire occurred on the mechanical rectifier.

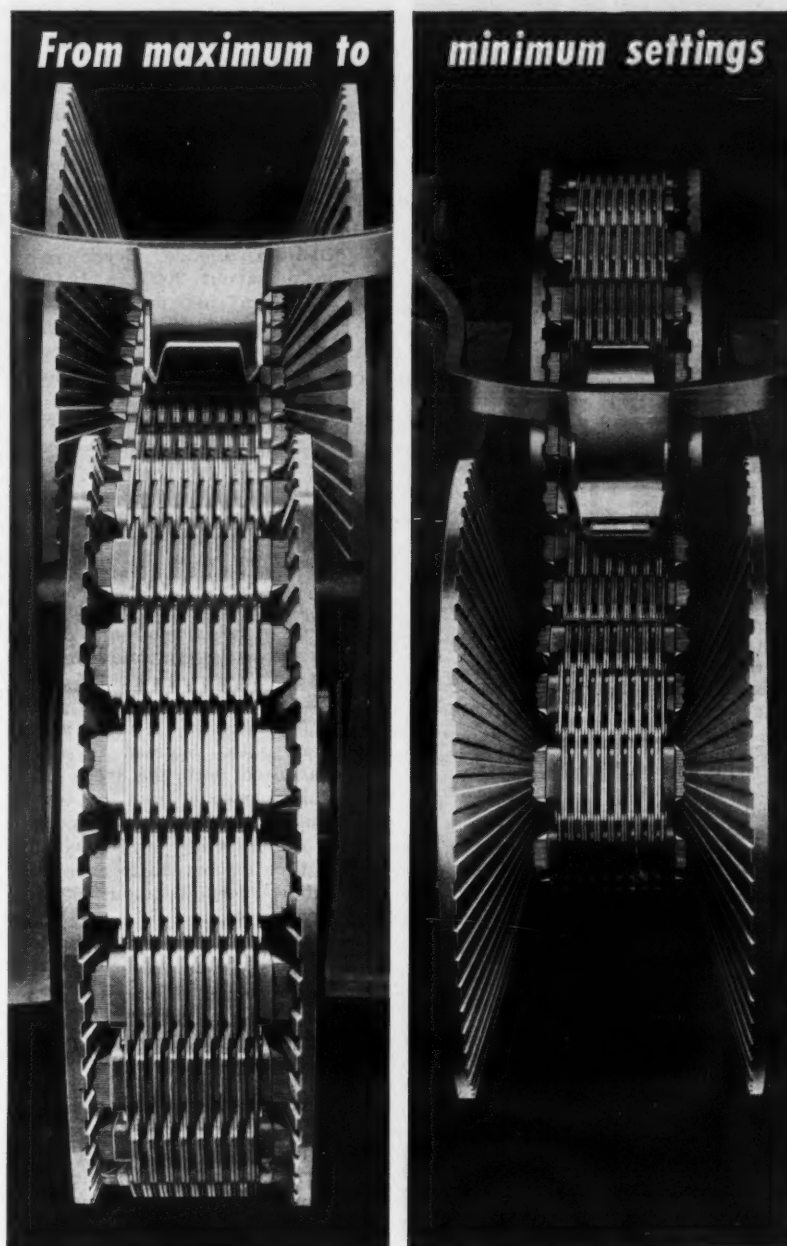
(Unitron semi-conductor rectifier was supplied by I-T-E Circuit Breaker Company, 19th and Hamilton St., Philadelphia 30, Pa.)

Check 3590 opposite last page.

Sodium reactor experiment and organic-moderated reactor experiment forum proceedings are contained in 248-page publication. The two experimental nuclear power reactor projects are being conducted for the AEC by Atomic International Div., North American Aviation, Inc. Discussion of engineering development work for 75,000-kilowatt nuclear power plant for the Consumers Public Power District of Nebraska, and description of full scale organic moderated reactor to be built for the city of Piqua, Ohio are also included. To obtain "Proceedings of the SRE-OMRE Forum", remit \$3.00 direct to Office of Technical Services, United States Department of Commerce, Washington 25, D. C.

For positive, accurate speed control

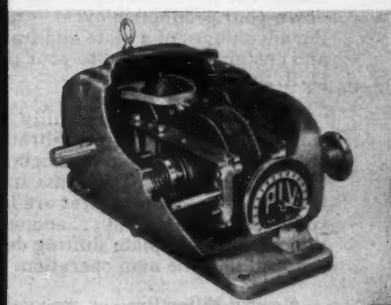
... there's nothing like P.I.V.



VARIABLE from top speed to minimum speed with no steps, no stops in between. That's Link-Belt P.I.V.—the *only* chain-driven variable speed drive. Teeth—not tension—permit instant ratio changes with no loss of speed, regardless of load conditions.

Slippage? Not a chance—P.I.V.'s chain-to-wheel grip is positive as a gear. In fact, this is industry's most accurate, most reliable mechanical variable speed drive.

Your Link-Belt office or authorized stock-carrying distributor has Book 2274 on P.I.V. drives from ½ to 25 hp. Refer to the yellow pages of your local phone directory under Power Transmission Equipment.



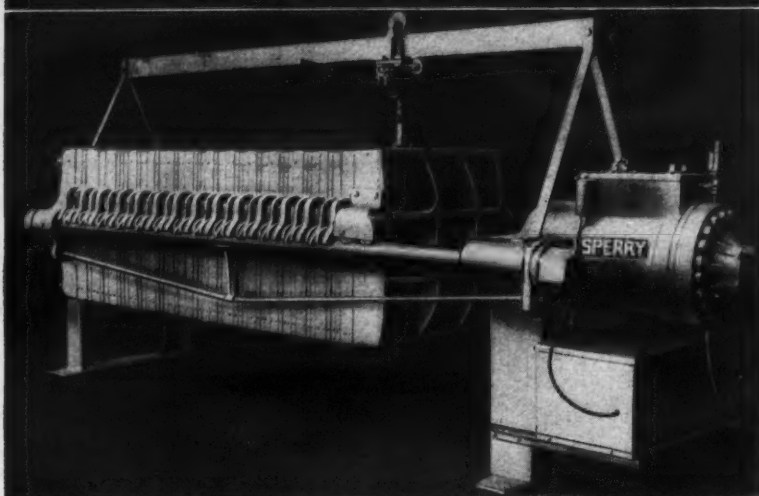
HOW P.I.V. WORKS. Exclusive self-tooth-forming chain of P.I.V. consists of packs of free-sliding steel slats which serve as teeth. Chain grips beveled grooves on pairs of conical wheels located on input and output shafts. Speeds are changed by varying the effective diameters of the wheels, as shown at left.

LINK-BELT
P.I.V. VARIABLE SPEED DRIVE

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office: New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World. 14.813

Check 3591 opposite last page

LOW DOWNTIME



with a plate and frame SPERRY FILTER PRESS

If your present filter system is inadequate to meet increased production demands . . . if excessive shutdowns, cleaning and manpower problems are dragging out your filter cycle so as to slow down your production cycle — now is the time to investigate all the advantages of a plate and frame filter press — as modernized and custom engineered to your particular application by D. R. Sperry & Company.

Through extreme versatility of design, a Sperry Filter Press can simplify the most complex filtration requirements. Varying batch sizes . . . incompatible products . . . cake removal . . . and constant cleaning cease to be problems. Instead — the cycle is reduced . . . filtering area and pressures are increased . . . downtime losses are reduced to a minimum . . . and with labor-saving automatic closing attachments and plate shifting devices, complete control is reduced to a one man operation.

Sperry Filter Presses are available in a design and capacity to handle any filterable mixture and any filter material . . . with center, side or corner feed; open or closed delivery; high or low temperature control; and your choice of labor saving devices.

FOR A LOW-COST ANSWER TO YOUR FILTRATION PROBLEMS, SEE THIS SPERRY CATALOG . . .
an up-to-date fully illustrated reference manual of erection, operating, design and construction data and specifications. Mail coupon for your free copy today.

D. R. SPERRY & CO.,
BATAVIA, ILLINOIS

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Batavia, Illinois

- ☐ Send Free Sperry Catalog Dept. CP-2
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Check 3592 opposite last page

NEW SOLUTIONS

Condensate return system cuts steam costs 40%, pays out in 30 days

Ups dryer's TiO_2 output
30% assures top quality
product

Problem: Method of boosting production and cutting steam costs on a large continuous, belt-type dryer was sought by an Eastern chemical company. Used to process titanium dioxide, dryer required about 9000 to 10,000 lb steam per hr. Product throughput averaged approximately 50 tons per 24 hr. Final material contained less than one percent moisture.

Dryer consists of six individually heated sections. Duplicate heating coils had been added to each section so that maximum production could be achieved within the physical limitations of the dryer itself. Boilers at the plant operate at 150 psi. Due to line losses between boiler room and dryer, actual steam pressure at dryer ranges between 125 and 135 psi.

Conventional open-type condensate removal system was used with the traps installed in each dryer coil section. The 12 traps discharged to a condensate header which in turn discharged to an open hotwell located about 50 ft from dryer.

Solution: Company installed a closed-loop, high-pressure condensate return system on the dryer. System returns condensate directly to boiler or make-up system with minimum heat loss and permits rapid and complete transfer of latent heat from steam to product. Thermal losses experienced with conventional open-drain systems are eliminated.

Key unit in the system is a jet pump energized by a centrifugal pump that is always primed by its own discharge pressure. Condensate from return line enters through strainer into pump's jet chamber. Here it is drawn into mixing chamber and circulating loop by the jet pump nozzle.

As condensate enters the

already-filled loop it causes discharge of equal volume of water through the air separator to the boiler supply line. Entrained air and gas are vented from system in a separator, and condensate is returned to boiler at high temperature.

Results: Dryer now uses only 6000 lb steam per hr while producing 65 tons product every 24 hr. This means that steam costs have been cut 40 percent and production upped 30 percent. Savings are so great that entire cost of the high-pressure condensate return system is recovered every 30 days of continuous operation.

Because of system's ability to up latent heat transfer, maximum efficiency is obtained from each drying coil within the dryer, accounting for the big production boost. Steam savings are due to the fact that steam remains within dryer coil at a high back pressure until all latent heat is transferred to the product.

After condensate return system was placed into operation, tests showed that condensate inlet pressure was 70 psi. Condensate is returned to boiler at 316°F, 160 psi.

Because of the uniform latent heat transfer, top product quality is also assured. Other advantages are that water treatment costs and make-up water needs are cut to a minimum.

(Further information about Cochrane C-B condensate drainage control units may be obtained from Cochrane Corporation, 17th below Allegheny Avenue, Philadelphia 32, Pennsylvania.)

Check 3593 opposite last page.

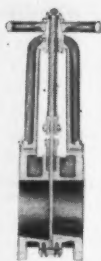
NEXT MONTH

Have process changes ever caused you trouble? How pipeline mixer whipped such a problem in bleach plant of Bowaters' giant \$100-million paper mill at Calhoun, Tenn., is told in next month's New Solutions section.

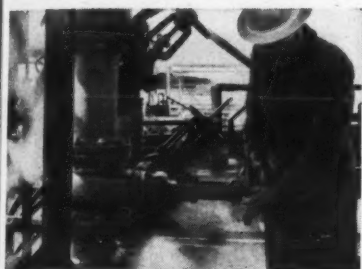
PROCESS PIPING POINTERS

Special design stainless valve for corrosive pulp stock

The knife-edge disc in this valve working with notched body outlet shears pulp fibers to make tight closure. Body and disc of stainless steel, and Exelloy stem, provide maximum corrosion resistance. New weight-saving, short face-to-face—ideal for use with light wall pipe. The Type 316 cast steel body is rigid and dimensionally accurate. This valve recommended where corrosion and clogging of pulp lines is a problem. Sizes to 16 in. Get circular AD-2156—see below.



High nickel-chrome stainless valve for sulphuric acid



This "Craneloy 20" gate valve was specially designed for handling sulphuric acid at elevated temperatures in a wide range of concentrations. Unique split wedge disc, free to rotate, gives increased resistance to corrosion and wear. Sizes ½ to 12 in.; flanged ends. Globe and check patterns also made. Get circular AD-2080. See below.

200-Pound bronze valves have new strength and safety

Newest design in bronze gate valves features cylindrical body shape, same as used for high pressure steel valves. It eliminates pinched effect on old rectangular body between ends and bonnet joint. Permits better, stronger integration of hex ends and body; provides wider wrench grip surfaces. Internally the circular body prevents stress concentration by uniformly distributing pressure load on body wall. For more data and literature, see Crane ad on next page.



For literature or data on product listed above, please contact
J. E. Bradbury, Manager,
Chemical Sales Dept. No obligation.

CRANE CO.

Gen'l Offices: 836 S. Michigan Ave., Chicago 5
VALVES • FITTINGS • PIPE
PLUMBING • HEATING • AIR CONDITIONING
Branches and Wholesalers Everywhere

processing and engineering data

Transmission of Gas at High Pressure

F. P. VANCE
Idaho Falls, Idaho

Following equation is useful in design of pipe lines for transmission of gas at high pressures:

$$Q = \frac{80.8}{\rho_0 \mu} \left[\frac{D^{4.85} M (P_1^2 - P_2^2)}{L Z_{av} T} \right]^{0.541} E$$

where

Q = quantity of gas transported in cu ft/day measured at P_0 and T_0

μ = absolute viscosity of gas, lb/ft-sec

ρ_0 = density of gas, lb/cu ft at P_0 and T_0

D = inside diameter of pipe, in

M = molecular weight of gas, lb/mole

P_1 = discharge pressure from compressors, psia

P_2 = suction pressure to compressors, psia

L = distance between compressor stations, miles

Z_{av} = average deviation (compressibility) factor

T = flowing temperature, °R

E = experience factor for adjustment of formula, 0.90

This equation is basis for accompanying nomograph², which facilitates solution of case for optimum spacing of compressor stations, pipe sizes, and other pertinent factors.

Typical Example

What should be diameter of a pipe needed to transmit 10 million cu ft of gas per day over distance of 15 miles at 100°F, if molecular weight of gas is 20, viscosity is 0.0001 lb/ft-sec and $(P_1^2 - P_2^2)/Z_{av}$ is 150,000?

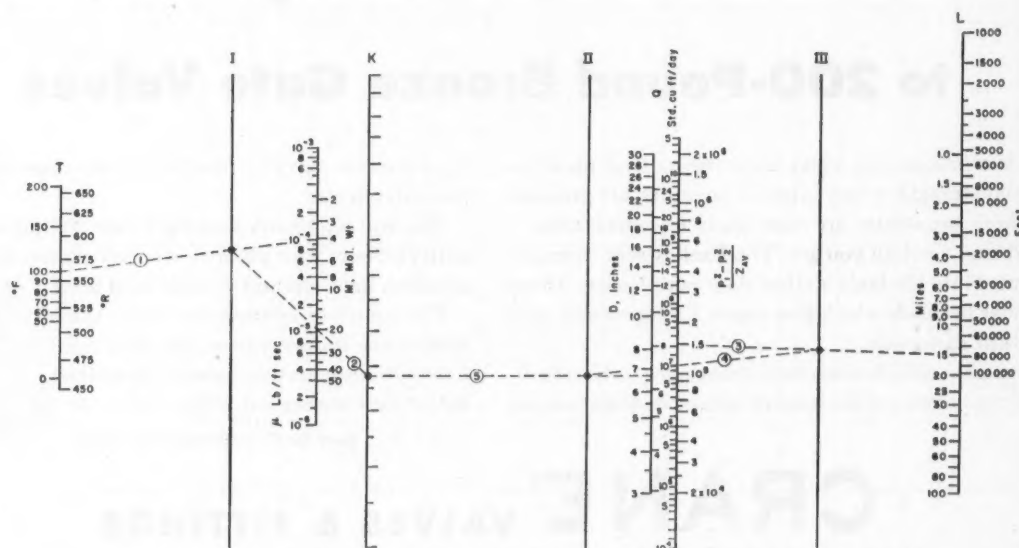
Connect 100°F on T and 10^{-4} on μ scales to locate an intersection with axis I. Extend a line from this intersection through 20 on M to meet the K axis.

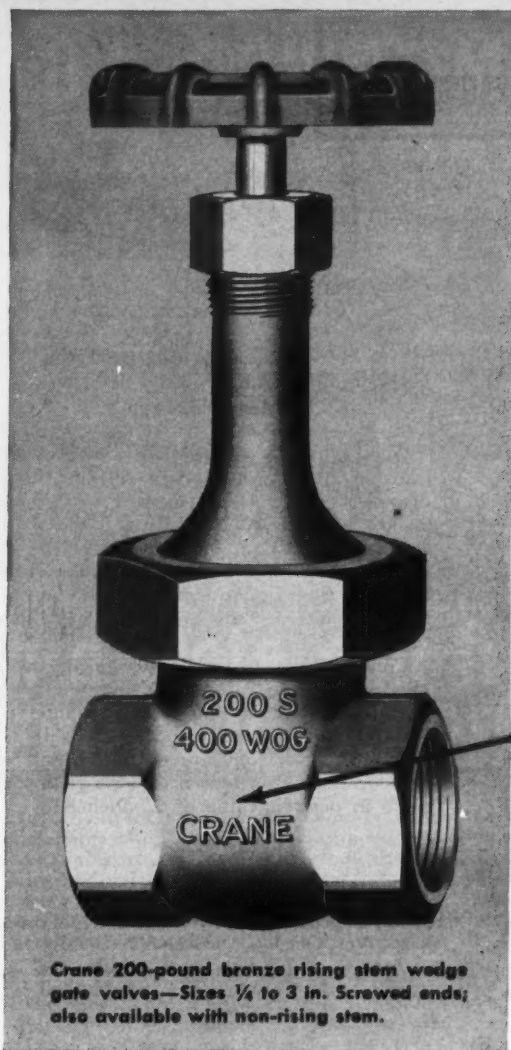
Connect 15 on L and $1.5(10)^5$ on the scale for $(P_1^2 - P_2^2)/Z_{av}$ and mark intersection with axis III. Extend a line from this intersection through 10' on Q scale to meet axis II.

Extend line from intersection found on K axis through intersection on axis II to meet D scale in desired value of 6.7 inches.

LITERATURE CITED

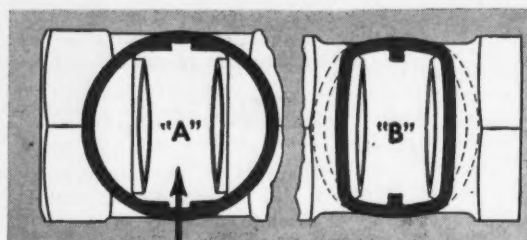
- 1) "High Pressure Pipe Line Research," Project 49, Clark Bros. Co., Inc., Olean, N.Y., (1942).
- 2) VANCE, F. P., AGA Meeting, New Orleans, May 1942.





Crane 200-pound bronze rising stem wedge gate valves—Sizes 1/4 to 3 in. Screwed ends; also available with non-rising stem.

Crane cylindrical body design ("A") distributes pressure load uniformly, resists distortion, prevents possibility of seat leakage under higher pressures. In ordinary, rectangularly shaped bodies ("B"), stresses concentrate where walls have shortest radius. Leakage and early failure may result from excessive deflection, and rupture may occur.



HERE CRANE adds new strength and safety

to 200-Pound Bronze Gate Valves

Here is a bronze gate valve body design that provides essential strength where internal pressures are greatest . . . where line strains are most likely to concentrate.

And that's not all you get. The Exelloy seat rings are expanded into the body so that they can't loosen. There are wider hex ends which give easier, firmer wrench grip and resist distortion.

Another quality feature that Crane offers is the shoulder at the bottom of the threads in port ends to restrain

the excessive entry of pipe that could cause damage to the valve seats.

You will find many uses for Crane 200-pound bronze gate valves in your plant—on steam, water, oil, gas, air, gasoline, light oils and volatile fluid lines.

For complete information about these new Crane bronze valves, see your local Crane Representative, or write to address below for Circular Ad-2285.

Send for Circular Ad-2285 today.



CRANE®

VALVES & FITTINGS
PIPE • PLUMBING • HEATING • AIR CONDITIONING

Since 1855—Crane Co., General Offices: Chicago 5, Ill.—Branches and Wholesalers Serving All Areas

Check 3595 opposite last page

NEW SOLUTIONS

**Conveyor speeds up
handling of dye,
keeps it clean**

Problem: Moving a black dye from one processing step to another in a multi-story building at the Bound Brook, N.J., plant of Organic Chemicals Division of American Cyanamid Company was a time-consuming, wasteful job.

Drums of dye had to be hauled manually across first floor to end of building, where a five-drum-capacity elevator was located. On third floor, drums again had to be hauled



Unground dye is dumped into conveyor for trip to second-floor mill

by hand to point where dye was gravity-fed to mill on second floor. Production increases caused tie-ups as drums piled up in long waiting lines.

Further complicating the operation was necessity of keeping dye free from contamination while it was being moved.

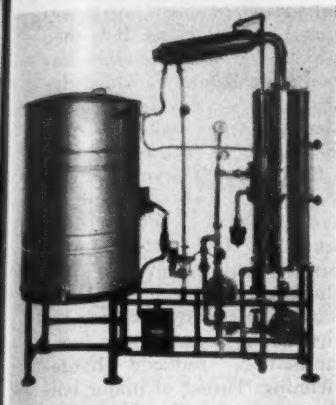
Solution: Conveyor which combines feeding, conveying and elevating was installed. Unit comprises a series of solid steel flights connected to an endless chain, enabling material to be moved in a substantially continuous stream through enclosed, dust-tight casing.

Drums of dye are dumped into feeding section of conveyor on first floor. Material is delivered directly into mill on second floor. Here, dye is

To page 50

CHEMICAL PROCESSING

PUREST WATER AUTOMATICALLY



Barnstead Still is SELF-STARTING SELF-STOPPING SELF-FLUSHING

It's the most reliable, efficient, and completely automatic method of producing distilled water . . . no human attention needed. Self-Starting, Self-Stopping, and Self-Flushing controls automatically guarantee a steady supply of distilled water of the highest purity. Catalog "G" provides complete description.

BARNSTEAD AUTOMATIC PURITY CONTROL

The Barnstead Puromatic Controller automatically tests each drop of distillate from the Still and permits only distilled water of a predetermined purity to enter the storage tank. Another Barnstead exclusive feature.

Write for PURE WATER CATALOGS

- ☐ Catalog "G"
Barnstead Water Still
- ☐ Catalog 127-A
Barnstead Demineralizers

Barnstead
STILL & STERILIZER CO. INC.

BOSTON Jamaica 4-3100	NEW YORK Kingsbridge 8-1557	CLEVELAND Academy 6-6622
CHICAGO Mullberry 5-8190	PHILADELPHIA Locust 8-1796	LOS ANGELES Ryan 1-6663
SAN FRANCISCO Templebar 2-5391		

66 Lanesville Terrace, Boston 31, Mass.

FIRST IN PURE WATER SINCE 1878



processing and engineering data

249

Energy Conversion Chart

JEROME A. SEINER

Pittsburgh Plate Glass Company
Springdale, Pa.

Accompanying chart offers convenient means of converting from one set of energy units to another.

Units included on this chart are: calories, watt-hours, cubic foot-atmospheres, horse-power-hours, foot-pounds, Btu's, liter-atmospheres, joules, and kilogram-meters.

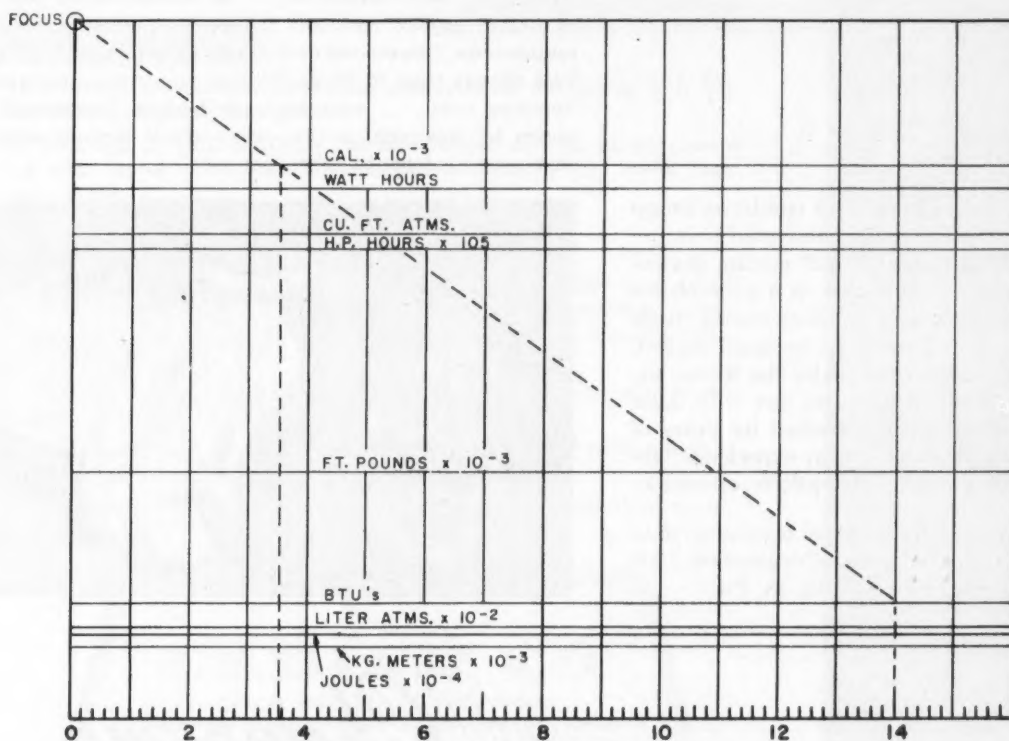
To use, enter horizontal scale of units vertically from bottom at numerical value of quantity to be converted — or at any multiple of ten of this value.

From intercept with horizontal line labeled with original units, draw a line upward to the left through point marked "Focus."

Intercept of this line with any of the horizontal lines gives converted values for those units.

Typical Example

Example shown by dotted lines indicates conversion from 14 Btu to 3530 calories.



THE BEST PUMP FOR LEAKPROOF SERVICE

Chempump eliminates

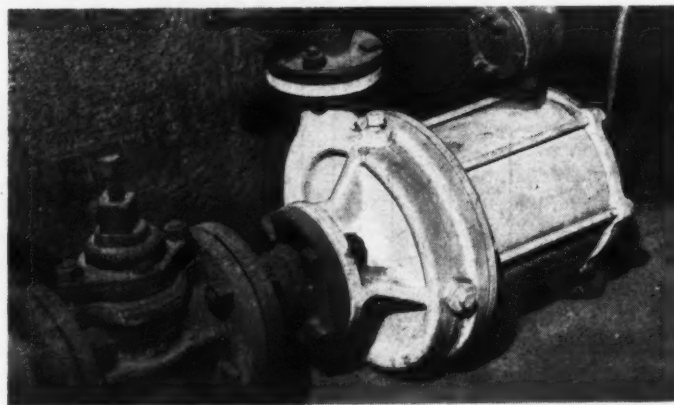
costly and dangerous

carbon tetrachloride leakage

Proved by this installation . . . at the chlorinated products plant of a major chemical company, Chempumps are used to handle carbon tetrachloride. Conventional centrifugals, formerly used to pump the fluid from storage tanks to drums and tank cars, ran up maintenance and downtime costs . . . were constantly leaking. Chempumps—the best pumps for leak-proof service—solve solvent leakage problems . . . save users thousands of dollars per year.

Here's how: Chempump combines pump and motor in a single, leakproof unit . . . no stuffing boxes or shaft sealing devices are required. Available in a wide choice of materials and sizes, they handle fluids ranging from Dowtherm to liquid oxygen. Chempumps are in use by the thousands . . . demonstrating every day why these field-proven pumps, backed by years of design and construction experience, are your assurance of *dependable* operation.

Write now . . . for "request for quote" data sheet . . . to Chempump Corporation, 1300 E. Mermaid Lane, Phila. 18, Pa.



Chempump

First in the field...process proved

Check 3597 opposite last page

NEW SOLUTIONS

From page 48

pulverized to meet pre-determined specifications. It is then gravity-fed into blenders immediately below. Finished dye also is gravity-fed from blenders into waiting drums for weighing, coding, testing.

Results: Conveyor delivers more than twice amount of dye handled by elevator. New operation has halved manpower requirements in this phase of operation. Enclosed, dust-tight conveyor casing has eliminated losses from contamination, reduced house-cleaning. Threat of major bottleneck on hauling drums has been removed.

("Flow Master" conveyor was manufactured and installed by Gifford-Wood Company, Hudson, N.Y.)

Check 3598 opposite last page.


Unitizing paraffin slabs slashes loading time and eliminates loss

Problem: It took three men three hours to hand-load a freight car of fragile, individual slabs of paraffin wax at the Philadelphia, Pa., plant of The Atlantic Refining Company. Method resulted in considerable breakage and posed threat of contamination. In addition, customers found unloading of single slabs slow.

Solution: Company, in cooperation with manufacturer of steel strapping, developed system by which stacks of paraffin slabs are packaged in two- or three-piece corrugated containers mounted on expendable pallets. These pallets and cartons are unitized and reinforced with four tensioned and sealed straps.

Slabs are stacked on bottom cap of container, which rests on expandable pallet, and are moved by lift truck to strapping area. There, the remainder of carton is placed over stack of slabs.

To page 52

For more information on product at right, specify 3599 . . . see information request blank opposite last page. 

LADISH

Controlled Quality

LIGHT WEIGHT WELDING NECK FORGED FLANGES 125 POUND



POSITIVE, LEAK-TIGHT JOINTS

Proven design principle of raised face flange has been adapted to assure a completely safe, positive connection to class 125 cast iron flat face flanges.

ELIMINATES NEED FOR HEAVY FLANGED ENDS ON VALVES AND PUMPS

No longer is it necessary to pay a premium to obtain the heavier flanged end valves, pumps and other piping components required to withstand bolting to raised face steel flanges in a welded piping system.

LOW WEIGHT—AMPLE STRENGTH

Light cross section design reduces weight to 30-50 per cent of ASA 150 pound Welding Neck Flange... still possesses ample strength to assure safe, leak-tight joint with mating cast flange.

LOWER COST

Savings in purchase price of Light Weight flanges are supplemented by additional savings realized by selecting valves on the basis of pressure rather than strength characteristic of flanged ends.

EASE OF INSTALLATION

Adequate welding neck type hub length keeps welding heats safely from flange. Prevents unpredictable warpage and deformation. Light weight facilitates handling, speeds positioning and installation.

MINIMIZES PIPEFITTER PRECAUTIONS

Safe and suitable for use with either carbon or alloy steel bolting... either full face or ring gaskets, in $\frac{1}{16}$ " or $\frac{1}{8}$ " thicknesses.

PRESSURE-TEMPERATURE RATING

Rating corresponds to ASA B16.1 class 125 cast iron flanges... 125 PSI (gauge) saturated steam, 175 PSI (gauge) water, oil or gas at 150° F.

SERVICE APPLICATIONS

Widely accepted for low pressure piping in gas distribution service... utility services such as water, heating, air conditioning, refrigeration... pumps and compressors.



TO MARK PROGRESS

Reduce cost...
eliminate breakage
of cast flanged-end
piping components
when bolting to steel
welding neck flanges

PIPING PROBLEM:

- (1) Difficulty experienced in making pressure tight connection with flat face flanges with full face gaskets.
- (2) Breakage of relatively brittle cast iron flanged ends on valves, pumps and other piping components when bolted to standard $\frac{1}{16}$ " raised face steel flanges.

LADISH SOLUTION:

The 125 pound Light Weight flange developed by Ladish is an ideal solution to this problem... for not only does it solve the problem... but it provides significant additional advantages of cutting purchase costs and reducing weight.

You can depend on Ladish for leadership in introducing piping developments to reduce cost and improve service.

A national network of distributors, Ladish plants and sales offices is ready to serve you.

Specification sheets on Light Weight Flanges and Welding Fittings available on request.



TO MARK PROGRESS

LADISH CO.

CUDAHY (Milwaukee Suburb) WISCONSIN

SALES OFFICES: Amarillo • Atlanta • Baton Rouge • Buffalo • Calgary
Chicago • Cincinnati • Cleveland • Denver • Havana • Houston • Los Angeles
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SAW BLADES • PIPE FITTINGS • DROP FORGINGS • RINGS • VALVES

LADISH... THE FITTINGS LINE THAT OFFERS COMPLETE SERVICE IN TYPES, SIZES AND MATERIAL SPECIFICATIONS

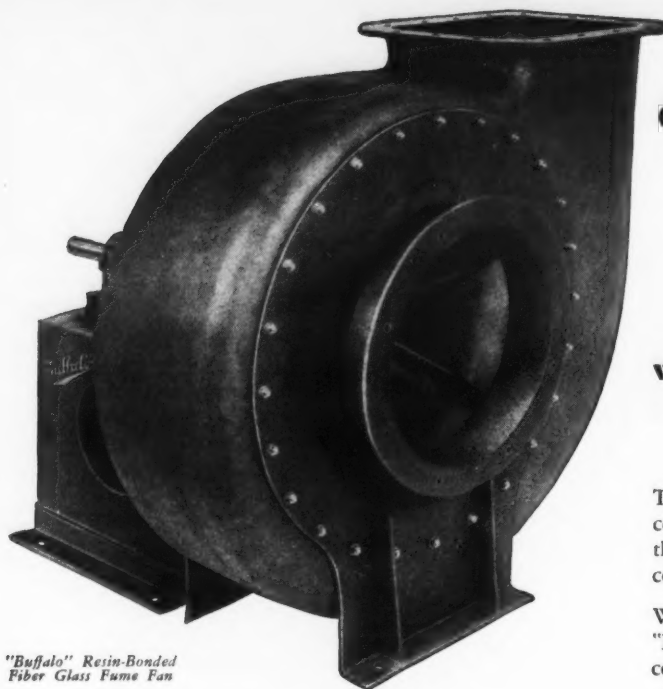
WELDING
FITTINGS

ASA & MSS
FLANGES

SCREWED & SOCKET
FITTINGS & UNIONS

LONG
NECKS

LARGE DIAMETER
& T.E.M.A. FLANGES



"Buffalo" Resin-Bonded
Fiber Glass Fume Fan

"Buffalo" Type "FG" Fume Fans provide superior chemical resistance to a wide variety of corrosives, including acids, salts, gases, organic materials. Temperature applications range up to 225°F.

The fan housing is formed of resin-bonded fiber glass. All exposed areas of the carefully-balanced steel rotor are encased in thick fiber glass. The "FG" is available in standard capacities up to 34,000 cfm at pressures to 10" static.

For full details, including chemical resistance table, write for Bulletin FI-511.

"Buffalo" Cast Iron Exhausters, widely-used throughout the chemical process industries, are engineered to operate under the most extreme corrosive conditions.

Husky cast iron housings, plus cast inlet cones with integral inlet vanes, guide air smoothly into the wheels. The result is the low-turbulence air flow inherent in this high-efficiency design. Non-overloading is insured, regardless of system pressure.

Three arrangements are available: direct motor drive, separate belt drive or a package unit with adjustable pitch V-belt drive and motor mounted on adjustable base rails.

For full information on "Buffalo" Cast Iron Exhausters, contact your nearest "Buffalo" Representative or write us direct.

"Buffalo" Gas Absorbers are designed for highly efficient removal and/or recovery of soluble gases, vapors and mists from exhaust systems before discharge to the atmosphere. Absorption is accomplished when the contaminant is completely in solution. This is accomplished by means of an absorbent liquid sprayed on a series of fiber cells.

Field performance tests prove that efficiency of "Buffalo" Gas Absorbers ranges up to 99.8%. Applications fall into two categories: removal of low concentrations from stack gas effluents for prevention of atmospheric pollution, and the absorption of process or off-gases containing sufficient material to make reutilization economically feasible.

Bulletins AP-225 and AP-2500 will guide you to the proper "Buffalo" Gas Absorber to solve your contamination problem. Write for it today.

EVERY "BUFFALO" PRODUCT FEATURES THE "Q" FACTOR — the built-in Quality which provides trouble-free satisfaction and long life.



**BUFFALO FORGE
COMPANY**

BUFFALO, N. Y.

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Check 3600 opposite last page

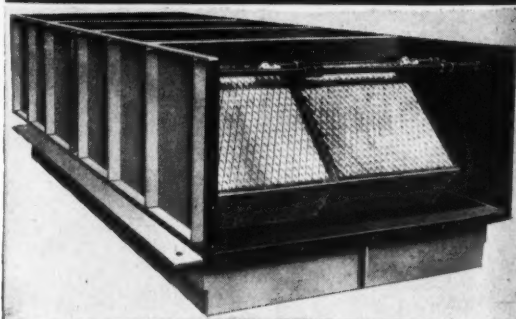
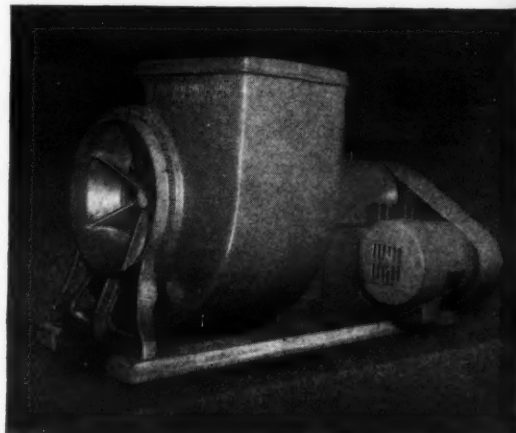
CORROSION-CONTROL PROBLEMS?

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The broad line of "Buffalo" equipment for corrosion control, plus our 80 years of engineering experience in this field, insures you of the most effective solution of your corrosive fume problems.

Whatever your specific needs, you will find the *right* "Buffalo" product with the *right* protective coating and/or corrosion-resistant parts to fill that need.

Contact your nearby "Buffalo" Engineering Representative, or write us outlining your problem. We will be glad to provide you with a prompt, practical, economical solution.



Top
"Buffalo" Cast Iron Exhauster

Bottom
"Buffalo" Gas Absorber



Polyurethane Reaction

M. J. CRAMER
919 N. Pasadena
Azusa, Calif.

Glycol derivatives and isocyanate derivatives react to produce polyurethane polymers. Percentage completion of reaction can be followed by titration of unreacted isocyanate group with 0.5N hydrochloric acid.

The equation:

$$100 - \frac{(\text{Batch Wt}) (\text{Titration Vol Diff}) (N) (\text{Equiv Wt})}{10 (\text{Sample Wt}) (\text{Wt of Isocyanate})}$$

gives percentage reaction. Total batch weight, weight of isocyanate added to batch, equivalent weight of isocyanate, and normality of acid are known.

Test procedure is performed by weighing a sample, adding 25 ml of dioxane-dinormal butyl amine and 25 ml of acetone or other solvent systems, and then titrating. A blank sample is titrated also.

Nomograph allows calculation for different size batches and different isocyanates of dif-

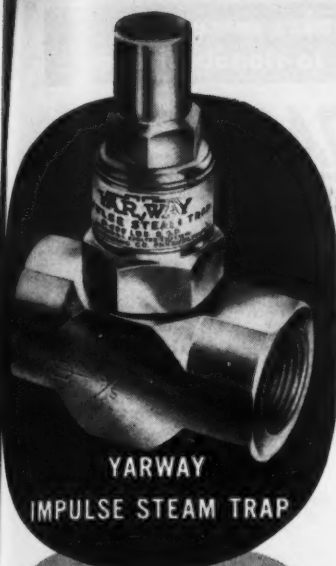
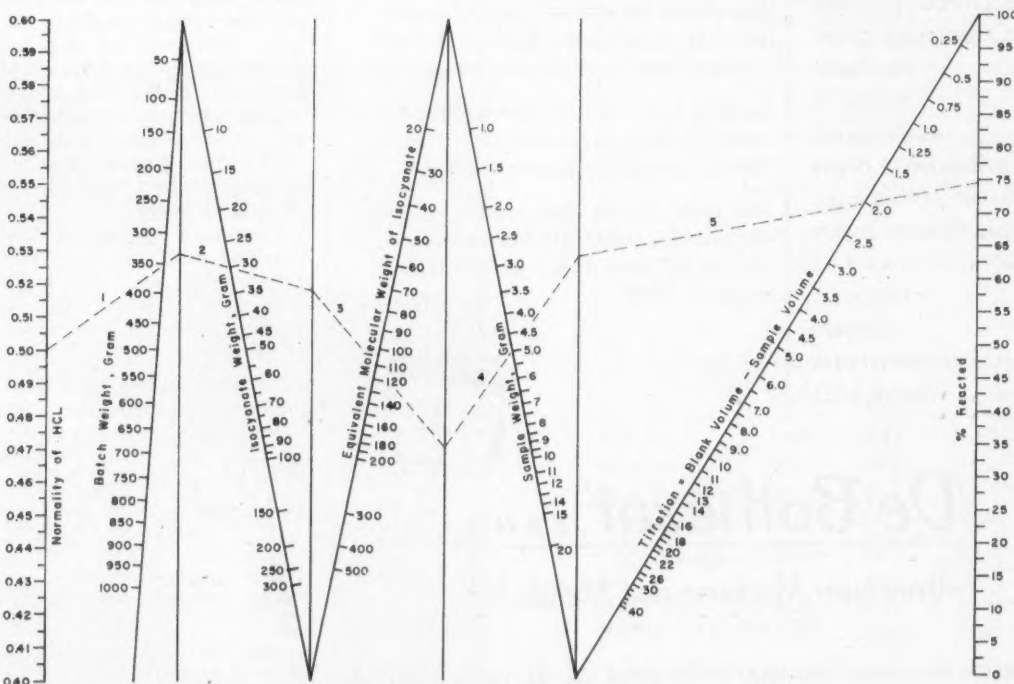
ferent equivalent weight. For large series of tests on same large batch over a period of time, a constant point will be obtained at the end of Step 3 so that the first three steps need not be repeated for each sample.

For batch larger than 1000g, batch weight and isocyanate weight can be divided by same factor to keep within range of chart.

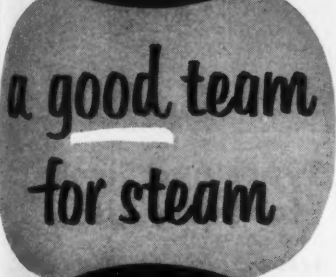
Typical Example

Broken line shows steps in sequence: A 350-g batch of polypropylene glycol and an isocyanate are mixed. Thirty g of isocyanate are used — equivalent molecular weight is 110. Half-normal acid is used to titrate a 5-g sample after three hours.

Difference in titration for a blank and sample is 2 ml. Percentage completion of reaction is read as 74.5%.



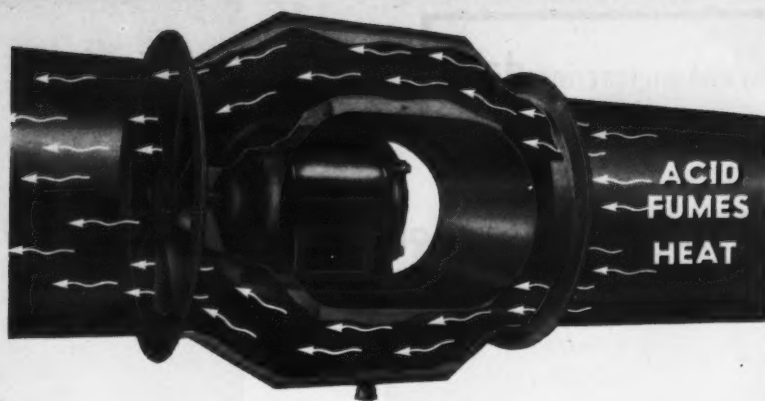
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Corrosive fumes and high temperature air never come in contact with a DeBOTHEZAT bifurcator motor.

That means less maintenance time and smoother operation month after month.

For acid atmospheres, DeBOTHEZAT bifurcators offer motor housings of acid-resistant metal alloys or with PVC (plasticized polyvinyl chloride) linings. Fan wheels can also be furnished in acid-resistant metal alloys, hot-dipped PVC or other corrosion-resistant coatings.

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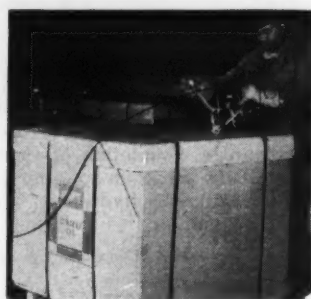
IN CANADA: Represented by DOUGLAS ENGINEERING CO., Ltd., Toronto • Montreal

Check 3602 opposite last page

NEW SOLUTIONS

From page 50

Two lengths of steel strapping, fed from coil in portable reel stand, are positioned top and bottom around unit at ends and sides. Corner protectors are placed beneath strapping at all eight edges of container. Strapping is tensioned, sealed, and cut by a



Steel strapping tool being used by operator tensions, seals, and cuts steel straps around corrugated carton containing slabs of paraffin wax

tool that combines all of these functions. Lift trucks then move packaged unit to shipping platform or to storage.

Results: Now it takes only 15 man-minutes to load freight car with unitized slabs. Breakage of slabs has been reduced, and loss through breakage has been eliminated by shipping in containers. Wax is protected from dirt, grease, and dust.

This latter is of particular value because many slabs are used in food processing applications, where cleanliness is of vital importance.

Customers' unloading and handling problems have been considerably eased, and product is arriving at destination in better condition than under old system.

(Packaging system uses 3/4" x .020" steel strapping and a 206 Steelstrapper, products of Acme Steel Co., 135th St., and Perry Ave., Chicago 27, Ill.)

Check 3603 opposite last page.

Plastic producing facilities, recently developed, are illustrated and discussed in brochure which includes among other things examples of injection molding. Write to Madan Plastics, Inc., 370 North Ave., Cranford, N. J.

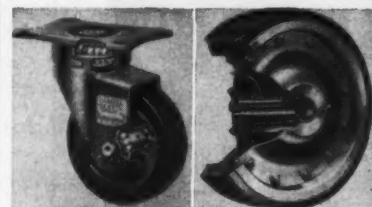
Check 3604 opposite last page.

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Check 3605 opposite last page

CHEMICAL PROCESSING



Sandwiches should be less expensive in the future . . . urethane foam sandwiches, that is. High raw material cost, a major block in road to expanding rigid foam applications, may soon shrink as . . .

Sorbitol Polyethers Lower Rigid Foam Cost 28%

Uses: A group of polyethers that are expected to replace more costly polyesters in rigid polyurethane foam manufacture including foams prepared by the "one shot" technique.

Features: Foam raw materials could reduce foam ingredient cost by amounts ranging up to 28%.

Prices of commercial polyesters used in rigid urethane

foams range from 50 to 70c per pound. Ingredient cost of a foam containing 60% polyester and 40% toluene diisocyanate, for example, would be 74c per pound, assuming costs of 70 and 80c per pound for polyester and toluene diisocyanate respectively.

A comparable foam containing 60% of one of these recently introduced sorbitol-based polyethers (Atlas G-

2410) and 40% toluene diisocyanate would have an ingredient cost of 53c per pound. This is assuming a proposed cost of 35c per pound for sorbitol derivative.

(Water and catalyst, being minor components, were neglected in making these estimates.)

Description: These polyethers are based on sorbitol, a white crystalline solid hexa-

hydric alcohol. Experimental reaction products of propylene oxide and sorbitol were prepared having hydroxyl numbers varying from 70 to 490. End products are pale to colorless free-flowing liquids soluble in a variety of solvents.

Usefulness of these resulting products arises from their high functionality, comparable to that of branched polyesters. They are not as viscous as the polyesters, making them easier to handle. They do not contain hydrolyzable ester linkage.

To next page



Typical Sorbitol Polyether Analyses

	2410	2421	2424	2428
Acid No.	0.34	0.47	0.67	0.79
Hydroxyl No.	493	260	146	93
Color (Hess-Ives)	2	1	1	1
Ash content, %	0.01	0	0.004	0
Water, %	0.10	0.15	0.15	0.12
pH	6.0	5.9	6.0	5.6
Iodine No.	0.39	0.35	1.12	4.04
Mol wt	760	1340	2500	4830

◀ Rigid urethane foam is strong, lightweight, quick-setting

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If you use coconut oil fatty acids or methyl esters in your formulations, Foremost-El Dorado's standards of purity and uniformity can give you a better end product—and less trouble. That's because, at El Dorado, Purity is Foremost . . . and has been for over 65 years.

EXAMPLE: Eldo Myristic acid is consistently over 95% pure—the purest commercially produced.

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FATTY ACIDS

Caprylic	Capric	Lauric
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Cocoleic	Eldhyco*	Coconut

METHYL ESTERS

Caproate	Caprylate	Caprate
Laurate	Myristate	Palmitate
Oleate	Eldo* 18	Coconate

*T. H. REG.



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CHEMICAL MATERIALS

From preceding page

To demonstrate use of these compounds in urethane foams, a number of foam formulas were developed using G-2410 with a hydroxyl number of 490.

In a typical laboratory scale Freon-blown formulation, a prepolymer was first prepared. The following ingredients were maintained at 70°C for one half hour while stirring

	grams
G-2410	403.8
TDI (80/20)	1036.0

During the preparation of the prepolymer the ingredients were stirred under an atmosphere of dry nitrogen.

To prepare the foam, the Freon-11 was first dissolved in the prepolymer in the following proportions:

	Parts by wt
X-520 silicone*	0.5
Prepolymer	100.0
Freon-11**	25.0

*Union Carbide Corp.

**E. I. du Pont de Nemours & Co.

In a separate vessel the following materials were mixed by high speed stirrer:

	Parts by wt
G-2410	76.0
Dabco catalyst*	1.5

*Houdry Process Corp.

Parts A and B were then stirred together and poured into a waxed box. Foaming occurred, due to the vaporization of the Freon. The resulting foam was white, had small, uniform cells, and a density of approximately 2 pounds per cubic foot.

In an experimental machine preparation of a foam (the "one shot" technique), following three streams were fed to the mixing head:

	Parts by wt
1. TDI (80/20)	82.0
G-2410	100.0
2. M-1 catalyst*	0.2
Water	2.9
3. Dabco catalyst**	0.2
X-520 silicone***	0.5

*Metal & Thermit Corp.

**Houdry Process Corp.

***Union Carbide Corp.

The resulting foam was tough, of uniform cell size, and had a density of approximately 3 pounds per cubic foot.

(Sorbitol polyethers are products of Atlas Powder Co., Wilmington 99, Del.)

Check 3607 opposite last page.

Check 3606 opposite last page

THAT'S INTERESTING

Solar sails in the sunset

Just as Christopher Columbus set sail for the new world, so may future explorers venture into the outer reaches of space. Solar-sail-propelled space ships are being studied by Los Alamos scientists. By using the pressure of solar radiation reflected by a large thin sail, extra-orbital propulsion could be obtained in the almost perfect vacuum of space. The sail would be made from extremely thin plastic film coated with evaporated aluminum. A space ship of 1000 lb would require a sail $\frac{1}{4}$ mile in diameter, and could conceivably navigate to Mars and back in about $2\frac{1}{2}$ years.

Poof!

A plasma gun has been developed which generates a temperature of 36,000°F, high enough to vaporize any known element.

For more information on product at right, specify 3608 see information request blank opposite last page.



Symbolized here is the uncontrolled (multi-point and premature) surface ignition on hot engine deposits that results in abnormal pressure rise and engine noise in some high-compression automobile engines. Driving conditions breed a problem too. Start-and-stop driving that builds excessive deposits is prime offender.

ATTACK ON A NEW KIND OF ENGINE KNOCK... Celanese compounds modify engine deposits, improve combustion, reduce noise

Two great industries face a real problem in uncontrolled combustion—which results in a rumbling vibration in the higher compression engines of some of today's automobiles. This new kind of engine knock not only disturbs car owners—it puts limits on compression ratios, gasoline composition, and potential engine efficiency.

Among fuel additives researched to combat abnormal combustion, only the organo-phosphorus compounds have been able to help; they modify the composition of hot engine deposits, thus control surface ignition, and reduce excessive pressure and engine "screaming."

Since the first phosphorus additives were introduced into motor fuels a few years ago, Celanese has been a leading supplier to a growing number of gasoline refiners. And indeed, phosphates—which we have been producing for 35 years—are only one member of a huge family of Celanese chemicals basic not only to the automotive and petroleum industries but to scores of others as well.

Whatever you produce, whatever your problem, perhaps there is some way in which we can serve you, too. Celanese Corporation of America, Chemical Division, Dept. 591-B, 180 Madison Ave., N.Y. 16.

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Basic reasons

Acids	Functional Fluids	Polyols
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Export Sales: Amcel Co., Inc., and Pan Amcel Co., Inc., 180 Madison Avenue, New York 16, N.Y.

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Check 3609 opposite last page

CHEMICAL MATERIALS

**Obtain crystal clarity
in vinyls with this
BaCd stabilizer**

Product resists yellowing and
plate-out

Uses: Stabilizer for vinyl
resins. It is compatible with
all commonly used plasticizers.
It is particularly suitable for
calendered and extruded
products.

Features: Compound pro-
vides vinyls with crystal clar-
ity, free from color even under
severe heat and light exposure.

Description: Barium-cadm-
ium stabilizer is a clear, light
yellow liquid with a specific
gravity of 0.957. It is miscible
in mixtures of hydrocarbon
solvents with ketones, esters,
and alcohols. General usage
level for calendered products
is between 2.5 and 3%; for
extruded products, 3% based
on weight of the resin.

Combinations of plasticizers
for special properties do not
present stabilization problems.
Product may be used with any
of the common fillers.

(Invin 91 stabilizer is a prod-
uct of National Lead Co., 111
Broadway, New York 6, N.Y.)

Check 3610 opposite last page.

**Use this PVAc resin
where water isn't
desirable**

Uses: Powdered emulsion
can replace liquid vinyl emul-
sions in paints, adhesives, and
dry-mix cements.

Features: Dehydrated emul-
sion should find wide use
wherever presence of water is
undesirable.

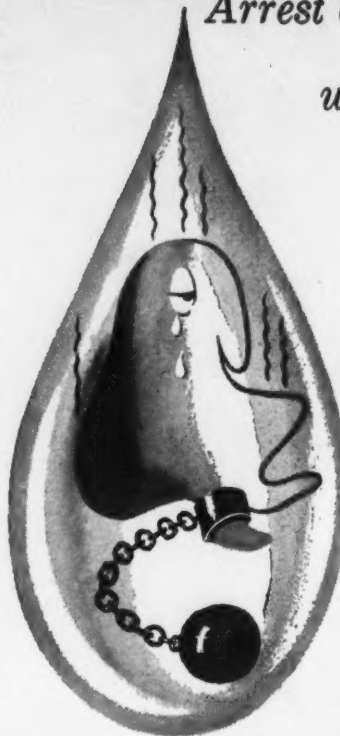
Description: Spray-dried
polyvinyl acetate resin is eas-
ily reconstituted by adding
water. A white powder, it can
be stored indefinitely is un-
affected by freezing. It is
available at 47c/lb in truck-
load quantities.

(Darex ECD spray-dried poly-
vinyl acetate is a product of
Dewey and Almy Chemical
Div., W. R. Grace & Co., 62
Whittemore Ave., Cambridge
40, Massachusetts.)

Check 3611 opposite last page.

Arrest bad odors...

use **SINDAR'S
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The elimination of unpleasant odor is
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merchandising, whether the product is a
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pertinent production data will help our
specialists select the right *Deodall*
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KNOX produces porcelain tower packings from the
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Check 3613 opposite last page

CHEMICAL PROCESSING

This substituted phenol has antioxidant and germicidal effects

Uses: Product is basically a phenol-formaldehyde resin component.

Features: Incorporation of this resin in varnishes greatly improves resistance of varnish film to water and alkali. Drying time is shortened. In addition, germicidal properties can be used to protect products such as glues. It also is an effective antioxidant in soaps and rubbers.

Description: Compound, p-tert-butylphenol, can be supplied flaked or as a concentrated solution in caustic. Bulk shipments of molten material can be made where required. It is readily soluble in most oxygenated and chlorinated solvents; moderately soluble in aliphatics. Solubility in alkaline solutions is also moderate although it is not soluble in water.

(p-tert-Butylphenol is a product of Stepan Chemical Co., 427 W. Randolph St., Chicago 6, Illinois.)

Check 3614 opposite last page.

Unusually high viscosity and molecular weight mark polybutene

Uses: For adhesives and pressure sensitive tapes, as thickening agent, and as capacitor insulation impregnant. It may also be used in lubricants to improve shear stability and as a viscosity index improver.

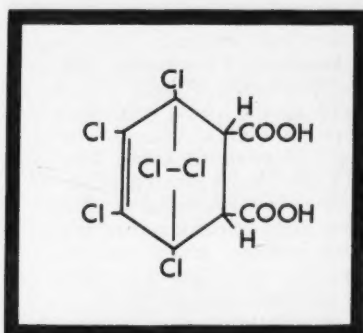
Features: Material has unusually high viscosity and high molecular weight. Viscosity is about 20,000 SSU at 210°F.

Description: Polybutene product is non-drying, light in color, and stable to sunlight. It is also moisture resistant and thermally decomposes without residue at temperatures above 650°F.

(Indopol polybutene is available from Amoco Chemicals Corp., 910 South Michigan Ave., Chicago 80, Ill.)

Check 3615 opposite last page.

BRIEFS



New intermediate is 54.7% stable chlorine

This is Het® Acid, also known as chlorendic acid. It is a versatile intermediate which undergoes typical dibasic acid reaction.

It's 99.5% pure in the form of fine, white crystals. The stable, high chlorine content makes it exceptionally useful for imparting flame retardance to various derivatives.

Forms salts with a variety of metals. Both mono- and di- sodium salts are easily formed.

Forms esters by the usual methods to produce dimethyl, diethyl, dipropyl, etc. Rate of esterification is quite rapid.

Forms anhydride by dehydration at high temperatures.

Forms amines and amides.

Forms resins with glycols and other polyols and with fatty oils to make flame-retardant oil-modified alkyds.

These are just a few of Het Acid's reactions which have commercial interest. For a cursory glance at the whole story send the coupon for technical data sheet or, if you'd like to go into this even deeper, send for our Bulletin 40.

Some things have to burn

Got a product you want to ignite in air—like a firecracker, or a match, or a fuse, or a signal flare?

We make two different chemicals that will help get it started: red phosphorus and phosphorus sesqui-



sulfide.

The red phosphorus is 99.4% pure and ignites in air at 200°C. The particle size is 99% min through 100 mesh.

The phosphorus sesquisulfide is a lemon yellow compound completely free of untrapped phosphorus. It ignites by friction. 90% goes through an 80 mesh screen. 80% goes through 100 mesh.

Technical data on both compounds offered in the coupon.

New booklet on benzoic acid and sodium benzoate



If you would like facts on these two chemical cousins in one compact little booklet, check the coupon for Bulletin 323.

It's chock full of useful data on both Hooker chemicals in both their

U. S. P. and Technical Grades.

on a highly chlorinated new intermediate...some phosphorus chemicals for igniting...new booklet on benzoic acid and sodium benzoate...an exhaustive chlorine manual

Free Chlorine manual

If you'd like 76 pages of facts on chlorine, send the coupon for Bulletin 125.

There's a lot of information on the chemical itself, including charts and graphs on its physical properties.

There's lots more on how to handle chlorine safely. Descriptions of equipment and containers should make it easier to run a safe chlorine handling program.

Finally, there is a listing of the advantages you enjoy as a user of Hooker chlorine. Dependable delivery, in scrupulously clean containers, is the important one. But there are many others.



For more information check here and mail with your name, title, company, and address.

- | | |
|---|---|
| <input type="checkbox"/> Het Acid, Technical Data Sheet | <input type="checkbox"/> Phosphorus Sesquisulfide |
| <input type="checkbox"/> Het Acid, Bulletin 40 | <input type="checkbox"/> Bulletin 323 |
| <input type="checkbox"/> Red Phosphorus | <input type="checkbox"/> Chlorine Manual |

When requesting samples, please use business letterhead to help speed delivery.

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502 FORTY-SEVENTH STREET, NIAGARA FALLS, N. Y.

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Check 3616 opposite last page

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Cincinnati, Ohio: Roselawn Center Bldg.
Houston, Texas: 1607 Jefferson Avenue
Tombola, Fla.: Chem-Quip Co., 1102 Texar Drive

Check 3617 opposite last page

CHEMICAL MATERIALS

Daylight fluorescent pigments now offered commercially

Eight colors are available

Uses: Pigments for paints, inks, plastics, and coatings for paper or cloth where high visibility or brilliant color is desired. They should be particularly useful in products for safety applications.

Features: Fluorescent pigments actually "reflect" more light of the color used than there is of that color in the light illuminating them. They are now being offered to industry in commercial quantities. Eight colors are available: pink, orange, green, medium orange, red, lemon yellow, cerise red, gold yellow.

Description: Finely powdered brilliant organic pigments fluoresce under ultraviolet or daylight illumination. They have no afterglow. Average particle size is 3.2-3.3 microns. They are insoluble in water, aliphatic hydrocarbons and most aromatic hydrocarbons; soluble in esters, ketones, and ethers. They are compatible with most vehicles.

(Bold daylight fluorescent pigments are available from Lawter Chemicals, Inc., 3550 Touhy Ave., Chicago, Ill.)

Check 3618 opposite last page.

Wide textile use seen for latex that has compatibility

Product's light stability is improved

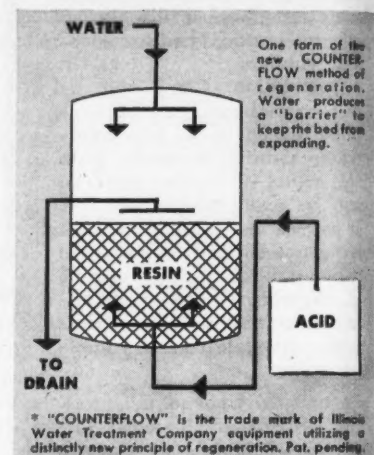
Uses: For modifying and sometimes replacing natural or chloroprene type latices.

Features: Elastomeric latex is reported to have superior resistance to metal staining, is light in color, has low odor, and improved light stability. Stability of emulsion system and compatibility with other systems should permit wide use in textile processing.

Description: Latex 2582 is based on vinyltoluene and butadiene.

Vulcanization is accomplished following standard

ILLCO-WAY ion Xchange COUNTERFLOW[®] REGENERATION OF ION-EXCHANGERS



"COUNTERFLOW" is a method whereby upward regeneration, which has long been recognized as most desirable, is successfully accomplished by establishing a "barrier" at the resin face.

LOOK AT THESE RESULTS!

- De-ionizer in a power plant. Conductivity of effluent improved from 10 micromhos to 4 micromhos after conversion to COUNTERFLOW. Cation leakage, expected at 4 ppm with downflow regeneration, actually is only 1 ppm.
- Chemical company in Middle West, 480 ppm TDS in raw water. Expected cation leakage with conventional regeneration, 9 ppm; with COUNTERFLOW, only 1.2 ppm.
- Distillery in Middle West. TDS in raw water, 575 ppm. Expected cation leakage with conventional equipment, 6 ppm; with COUNTERFLOW, is actually only 1.5 ppm.
- Western power plant, converted to COUNTERFLOW. Savings in acid reduction, \$16,000.00 per year. TDS in raw water, 342 ppm. Predicted cation leakage from curves for conventional design equipment, 4 ppm; with COUNTERFLOW, actually only 1.6 ppm.

ILLCO-WAY
ILLINOIS WATER
TREATMENT CO.
840 Cedar St.
Rockford, Ill.

NEW YORK OFFICE: 141 E. 44th St., New York 17, N.Y.
CANADIAN DIST.: Pumps & Softeners, Ltd., London, Ont.

Check 3619 opposite last page
CHEMICAL PROCESSING

CHEMICAL MATERIALS

Typical Properties

Solids content, %	41
Specific gravity (at 25°C)	0.981
Lb/gal	8.3
Latex pH	10.5
Viscosity, cps (Brookfield model LV viscometer, No. 1 spindle, 20 rpm)	25.0

practices. Latex is supplied with minimal soap stabilization for maximum formulating flexibility. It is sufficiently stable to permit normal shipping and handling practices.

(Latex 2582 is a product of Dow Chemical Co., Midland, Mich.)

Check 3620 opposite last page.

More fluoroalcohols make their bow in quantity

These compounds promise value as intermediates

Uses: High fluorine content organic intermediates for pharmaceuticals, dyes, surface active agents, plastics, elastomers, coatings, and other chemical products.

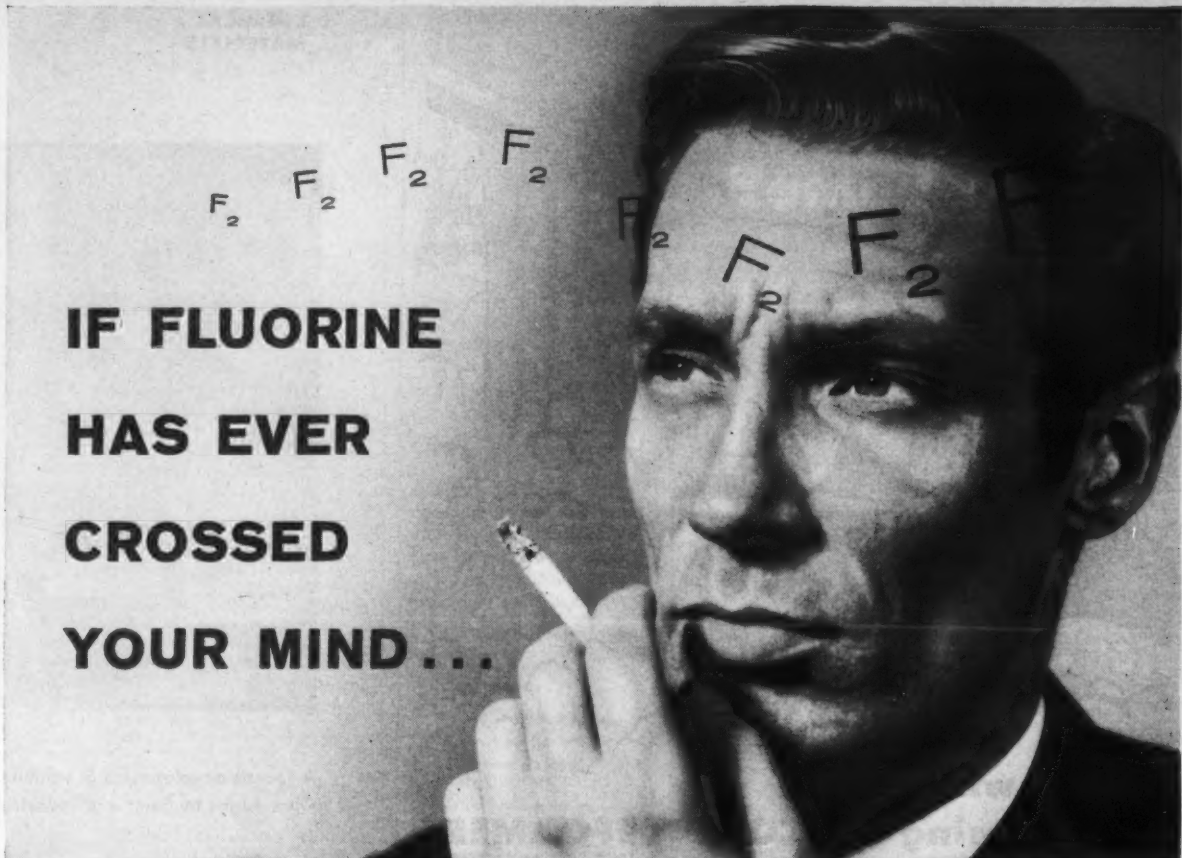
Features: Three new compounds, supplementing other fluoroalcohols introduced earlier (See CHEMICAL PROCESSING, September 1958, page 91), are now available in quantity. High reactivity of compounds should make them valuable as intermediates for many products needing special characteristics provided by fluoro content.

Description: Identified as C7, C9, and C11 fluoroalcohols (technical grade), compounds have a fluorine content varying from 68.6 to 71.4%. Boiling points range from 129 to 181°C at 200 mm pressure. All compounds undergo reactions characteristic of primary alcohols.

Initial price is \$40/lb, with long-range possibility of substantial reduction if sufficient demand develops.

(For more information on C7, C9, and C11 fluoroalcohols contact Dyes and Chemicals Div., Organic Chemicals Dept., E. I. du Pont de Nemours & Co., Wilmington 98, Del.)

Check 3621 opposite last page.



**IF FLUORINE
HAS EVER
CROSSED
YOUR MIND...**

Now's the time to try it!

Time was when the thought of using elemental fluorine would be dismissed quickly. Both handling and availability presented major problems. But tremendous progress has been made in both these areas. And today, *if you've ever thought about using fluorine, now's the time to investigate!*

As the leading producer of fluorine, General Chemical has played a major part in these developments. General developed the first and only practical method for shipping fluorine as a liquid in bulk—making it

available in commercial quantities for the first time... making fluorine easier and more economical to use, handle and store. General also provides a convenient source of supply for fluorine gas in cylinders. And, to enable laboratory researchers to work with fluorine more safely and more easily, General has developed and tested a reliable new system for handling fluorine in the laboratory. A comprehensive, illustrated data sheet on this development is available, complete with schematic diagrams and directions.

As a result of these significant advances, you can now experiment with fluorine in the laboratory more conveniently and at minimal risk. If fluorine offers profitable avenues of investigation or commercial application, and you need elemental fluorine in large quantities, General Chemical is ready to meet your requirements.

For further information, just write or phone. Ask for our comprehensive technical bulletin, "Fluorine," or "Handling Elemental Fluorine in the Lab."

First in fluorine chemistry



GENERAL CHEMICAL DIVISION
40 Rector Street, New York 6, N.Y.

Check 3622 opposite last page



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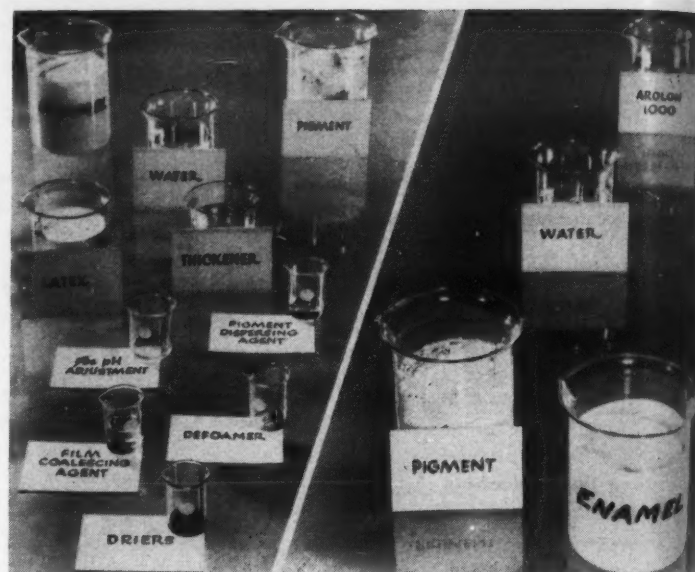
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COMPANY			
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Oil system			
Aqueous system			
Food products			
Other			

Check 3623 opposite last page

CHEMICAL MATERIALS



A recent development in vehicles promises numerous advantages to paint and industrial finish manufacturers

Versatile water- eases formulating,

Uses: A water-soluble resin vehicle for finishes. It is particularly suitable for high-quality baking enamels.

Features: Resin eliminates hazard of flammable solvents, yet retains properties associated with conventional organic-solvent-thinned alkyd-melamine systems. In formulating, no thickeners, resin modifiers, stabilizers, driers, bactericides, wetting agents, or film coalescing agents are required.

Material is so fire safe that its spray will extinguish flame of a blow torch.

On heating, resin converts to a hard, tough, mar-resistant film. Color retention, gloss retention, and resistance to soap and solvents rival that of melamine-modified coconut alkyds. In addition, resulting film equals melamine-modified short-soya alkyds in adhesion,

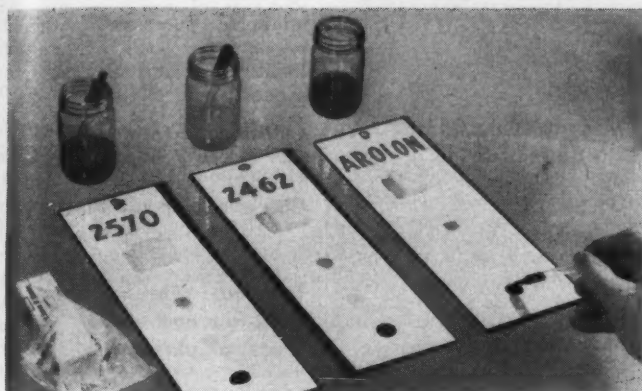
toughness, mar-resistance, juice and grease resistance, salt spray resistance, and water resistance.

Resin is an efficient grinding vehicle applicable to cus-

Hardness of Resin Film*

Baking schedule		Sward
Minutes	°F	hardness
20	200	16
30	200	20
40	200	32
20	250	28
30	250	34
40	250	34
20	300	34
30	300	36
40	300	36

*Based on 1.5 mil wet film drawdowns of clear resin at 45% solids on glass, baked without driers or catalysts.



Film formed by water-soluble resin equals conventional films in resistance to butter, fruit acids, and cooking greases

Formulating industrial enamels is simplified with water-soluble resin (right) compared to conventional water-emulsion resin (left)

soluble resin increases safety

tomary pigment dispersing techniques.

Description: Water-soluble resin, Aroclon 1000, is a low-viscosity, light colored solution. Being a solution rather than an emulsion it presents no freeze-thaw problem.

A broad range of colored enamels can be formulated. However, compatibility with pigments is more critical than pigment compatibility of solvent-cut resins. Each grade pigment should be carefully checked. Control of pH is important. Paint should be kept alkaline. Addition of basic organic materials, such as amines, for example triethylamine, may assist in stabilizing enamels employing acidic pigments.

Spray application of formulations using Aroclon 1000 requires some modifications in standard spray techniques due

to the slower rate of water release compared to usual solvents present in industrial finishes.

Specifications

Solids %	45 ± 1
Color, max (Gardner '53)	3
pH	7.5-9.0
Lb/gal (soln)	9.0-9.15
Lb/gal (solids)	10.9
Reduced viscosity	
C-E	25% ± 1

Dilution characteristics are somewhat different from viscosity reduction of conventional organic solvent-cut systems. Between 35 and 45% there is little change in viscosity of resin solution. Further addition of water causes

Nalcamine IDEA LIST

● These are a few of the characteristics and possible uses of Nalcamines that may give you profitable ideas for their application to your products:

☐ Cationic surface-active agents—can be made either water- or oil-soluble.

- Wetting agents.
- Foaming agents.
- Emulsifiers and demulsifiers.
- Anti-corrosion agents.
- Anti-static agents.

☐ React on an equimolar basis to form salts.

- Adjustable oil and water solubility.
- Excellent stability at low pH.

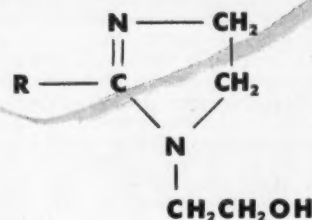
☐ Selectively adsorbed on many different surfaces in both oil and water systems.

- Improve asphalt coatings; better resistance to water stripping.
- Change water accepting surfaces to water repelling surfaces.
- Provide dispersion and lubricity in rubber, plastics, asphalt.
- Improve paint bonding and water repellancy.
- Increase efficiency of flotation processes.

☐ If you want wetting, dispersion, foaming or emulsification as "built-in" characteristics of your products, check with Nalco on the suitability of Nalcamines to do the job.

NALCAMINES are of the imidazoline (glyoxalidine) class of cyclic tertiary amines, now being manufactured with controlled purity and uniformity for practical-commercial use.

TYPICAL Nalcamine structure where R is a long hydrocarbon chain.



Now the exciting possibilities of cyclic tertiary amines are practical for adaptation into commercial products with the use of Nalcamines. Control of purity and uniformity, combined with practical pricing, put the Nalcamines solidly into the class of economically-sound working chemicals.

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Serving Industry Through
Practical Applied Science

Check 3624 opposite last page

Progress Report...

Modern pharmaceuticals are derived from new chemicals

New chemicals from CARBIDE are finding many uses in the pharmaceutical industry. New low-cost solvents have lowered operating costs, and pharmaceutical companies are using new intermediates in the manufacture of drugs.

Primary amyl acetate is a useful extraction solvent with interesting properties. Its solubility in water is less than 0.2 per cent by weight; it has a narrow boiling range near 150°C.; its vapor pressure at 20° is only 3.8 mm.; and the CARBIDE product is nearly 100 per cent in amyl ester content. These properties mean lower volatility losses, reduced losses into the aqueous phase, more efficient extraction, improved solvent recovery, and higher yields of the extracted product. The savings realized from the use of the new primary amyl acetate have established this CARBIDE product as a choice penicillin extractant; and this unique extractant shows promise for use with other antibiotics and steroids.

Primary amyl alcohol is a solvent which, like primary amyl acetate, has a high boiling point, low solubility in water, and is a pure mixture of primary C₅ alcohols. Primary amyl alcohol is used as a purification, recrystallization and extraction solvent.

Propionic acid, produced by CARBIDE from propionaldehyde, is a quality intermediate for drugs, hormones, and fungicides. Propylene glycol dipropionate is an effective fungicide, and zinc propionate is used in the treatment of ringworm and athletes foot. Propionyl salicylic acid is an antirheumatic, and triphenin (propionyl phenetidine) is an antipyretic.

2-Methylpentaldehyde, a derivative of propionaldehyde, is an intermediate for Meprobamate, one of the important tranquilizing drugs.

Propionaldehyde is an intermediate for Tetronal soporific and propionic anhydride is used as an intermediate for propiophenone, propionates, and related drug intermediates.

Butyric acid is an intermediate for the preparation of anti-thyroid drugs and bronchial antispasmodics.

Isobutyraldehyde is a CARBIDE product used in preparing pantolactone, pantothenic acid, and calcium pantothenate.

These are some of the established pharmaceutical uses for CARBIDE's new products. Each is characterized by high purity, assured through careful quality control and rigid specifications. New products which should find use in this field include —

- 1-Pentanol (99+ % straight-chain, primary alcohol)
- 2-Methyl-1-butanol
- Valeric acid
- 2-Methyl-pentanoic acid
- iso-Pentanoic acid (mixed isomers)
- iso-Decanoic acid (mixed isomers)
- iso-Pentaldehyde (mixed isomers)
- Valeraldehyde
- 2-Methyl-1-pentanol
- iso-Hexanol (mixed isomers)
- 2,2,4-Trimethyl-1-pentanol
- 2,2-Dimethyl-1-butanol
- iso-Eicosanol (mixed isomers)
- 2,2-Dimethyl-1,3-propanediol
- 2-Methyl-2-ethyl-1,3-propanediol
- 2,2,4-Trimethyl-1,3-pentanediol
- 2,2-Dimethyl-1,3-butanediol
- Ethyl-3-formyl propionate
- Ethyl-4-formyl butyrate
- Ethyl-3-formyl-2,5-endomethyl-cyclohexane carboxylate
- These new chemical intermediates are available in less drum quantities for your use in research and development.

Blending liquid systems or improving latex paints?

Most systems comprised of oils and liquids that are ordinarily difficult to blend can be effectively coupled by the addition of hexylene glycol (2-methyl-2,4-pentanediol). Industrial cutting oils, soluble oils, liquid detergents, dry-cleaning soaps, and emulsions are representative of mixtures that become miscible with the aid of hexylene glycol.

The inclusion of hexylene glycol in alkyd-modified styrene-butadiene latex paint formulas permits a higher pigment volume concentration and improved leveling with brush or roller. The paint film gains extra scrub resistance, better hiding properties, and less yellowing at a lower cost per pound of solids.

Hexylene glycol improves the solubility and penetration of textile oils, paper coatings, and leather dressings.

— new pharmaceutical chemicals
— hexylene glycol

Lacquer-type inks, and both specialty and standard inks based on resins insoluble in ethylene glycol or diethylene glycol, can be formulated with hexylene glycol. Its evaporation rate is also of benefit in fast-drying and steam-set inks.

Hexylene glycol helps to reduce particle size and to prevent agglomeration during grinding operations involving silicious materials or Portland cement. A more uniform aggregate is obtained, while valuable time is saved.

Other important uses of hexylene glycol are in the synthesis of sulfonates, esters and diesters. A 62-page booklet, "Glycols," contains properties and other facts about hexylene glycol together with profitable information about CARBIDE's other glycols. Check the coupon for a copy.

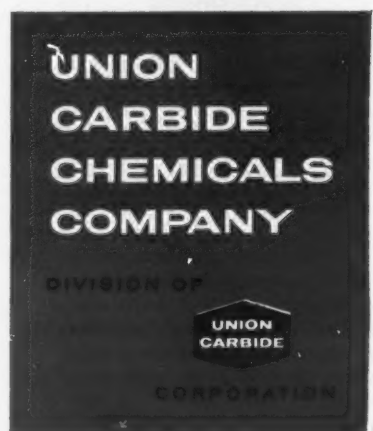
Tear out this coupon. Check the boxes on which you'd like more information, and mail to Dept. H, Union Carbide Chemicals Company, 30 East 42nd Street, New York 17, N. Y.

☐ "Glycols" booklet. ☐ Send address of the nearest Carbide office.

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CHEMICAL MATERIALS

viscosity to decline sharply. Solution is pre-stabilized to minimize corrosion. Normal precautions, such as use of lined cans and drums, are suggested.

(Arolon 1000 is a product of Archer-Daniels-Midland Co., Minneapolis 40, Minn.)

Check 3626 opposite last page.

Treated-Teflon bonders hold to wood, steel, glass, or plastics

Two-component adhesives can cure at room temp

Uses: Cementing bondable Teflon to itself or to other materials.

Features: Adhesives will bond etched Teflon to wood, steel, glass, aluminum, ceramics, plastics, or any material that will bond with an adhesive. They can be cured at room temperature or at elevated temperatures.

Description: Two products are offered: First (R-86009), is recommended where some flexibility in bond is required. It has good resistance to water and most chemicals. Second (R-86044), has excellent resistance to acids (except acetic) as well as water and other chemicals. It can be used as a structural adhesive at temperatures up to 200°F.

Both materials are two-component systems. They are prepared by mixing base and activator in specified amounts. Pot life for R-86009 is two hours. For R-86044, pot life varies from 40 min for a 100-gram batch to 20 min for a 600-gram batch. Cooling extends this time.

(Ray-Bond R-86009 and R-86044 are products of Adhesives Dept., Raybestos-Manhattan, Inc., Bridgeport 2, Connecticut.)

Check 3627 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

Check 3625 opposite last page

Medium nitrile rubber is easy processing elastomer

Has good qualities of low, high temp products

Uses: Product is suitable for those applications where oil, fuel, and solvent resistant characteristics of nitrile rubber are needed.

Features: Easily processed nitrile rubber offers better physical properties and improved process characteristics of low-temperature polymers while retaining excellent molding qualities of rubbers polymerized at high temperatures.

Description: Cold, medium nitrile is stabilized with a non-discoloring antioxidant.

Mooney visc MI 4' (@ 212°F)	53
Solubility in MEK, %	99
Ash, %	0.40
Moisture, %	0.02

Compound mixes readily with other compounding ingredients. It is stable at normal processing temperatures and can be handled by normal rubber storage procedures.

(Chemigum N600 medium nitrile rubber is a product of Chemical Div., The Goodyear Tire & Rubber Co., Akron 16, Ohio)

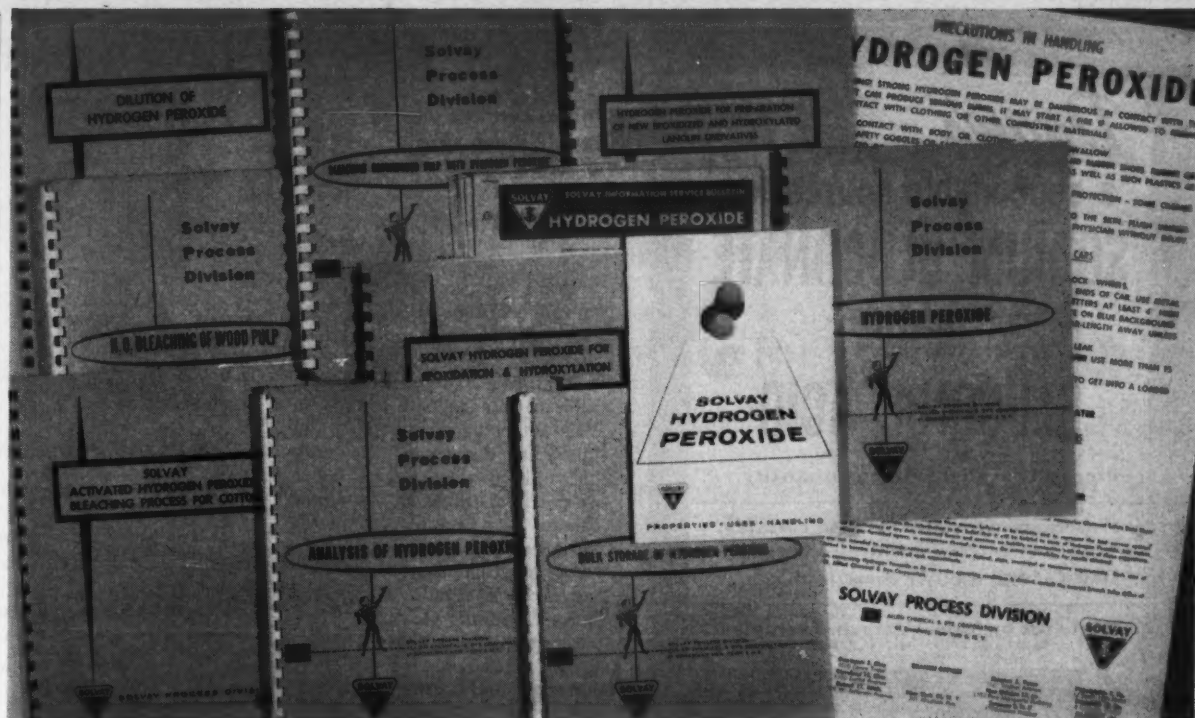
Check 3628 opposite last page.

Wall chart lists properties, applications, and recommended treatment levels for 22 industrial fungicides. Feature of chart consists of readily usable conversion tables for quickly computing fungicidal concentrations for various applications. Wall Chart — Nuodex Products Company, Division of Heyden Newport Chemical Corporation, Elizabeth, N. J.

Check 3629 opposite last page.

Paraffin waxes, both microcrystalline and fully refined, are described in 16-page technical bulletin which includes properties, testing methods, and packaging. Nineteen data charts are used. Tech Bul 22 (Revision 2) — Industrial Products Dept., Sun Oil Company, 1608 Walnut St., Philadelphia 3, Pa.

Check 3630 opposite last page.



AVAILABLE TO YOU — TECHNICAL DATA ON SOLVAY HYDROGEN PEROXIDE

To help you in your current operations—here is authoritative information on the analysis, uses, handling and storage of SOLVAY Hydrogen Peroxide. These booklets, bulletins and the wall precaution chart have been compiled from accepted sources, from SOLVAY's own research and from 77 years of field experience with chemical consumers in virtually every industrial category. Check the contents of the individual items—then check those that may be helpful to you on the coupon and mail.

- HP-1—Solvay Hydrogen Peroxide: Physical properties, chemical reactions, shipping containers, handling, storage. 21 pages.
- HP-2—Wall Chart: Precautions for handling hydrogen peroxide.
- HP-6—Hydrogen Peroxide Bleaching of Wood Pulp: Applications and methods. 28 pages.
- HP-7—Hydrogen Peroxide Bleaching of Groundwood Pulp: Chemicals used, analytical methods, bleaching operations. 15 pages.
- HP-9—Hydrogen Peroxide Bulk Storage: Bulk shipping and storage equipment, equipment suppliers. 13 pages.
- HP-10—Analysis of Hydrogen Peroxide: Analytical methods, reagents, indicators, standard solutions. 31 pages.
- HP-13—Solvay Hydrogen Peroxide for Epoxidation & Hydroxylation: Up-to-date review and bibliography, methods, olefins used, present and potential uses of products. 8 pages.
- HP-14—Solvay Activated Hydrogen Peroxide Bleaching Process for Cotton: Process description, operation details, commercial applications, cost and quality comparison. 7 pages.
- HP-15—Dilution of Hydrogen Peroxide: How to dilute accurately, equipment and materials needed. 9 pages.

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SOLVAY branch offices and dealers are located in major centers from coast to coast.

- HP-16—Hydrogen Peroxide: Up-to-date review of properties, stabilization, manufacturing methods, purification and concentration (prepared on request for new issue of Encyclopedia of Chemical Technology). 20 pages.
- HP-17—Hydrogen Peroxide for Preparation of New Epoxidized and Hydroxylated Latex Derivatives: Study of preparation methods and determination of reaction products' characteristics. 8 pages.
- NO. 1-56—Information Service Bulletin: Directions and equipment for emptying drums of hydrogen peroxide.
- NO. 8-1057—Information Service Bulletin: Directions for unloading tank cars of hydrogen peroxide.
- NO. 6-56—Information Service Bulletin: Hydrogen peroxide in oxidation of vat dyes.
- NO. 2-57—Information Service Bulletin: Hydrogen peroxide in finishing electroplated surfaces.
- NO. 6-57—Information Service Bulletin: Hydrogen peroxide in foam rubber manufacture.
- NO. 4-57—Information Service Bulletin: Hydrogen peroxide in shellac bleaching.
- NO. 7-957 and NO. 9-1157—Information Service Bulletins: Hydrogen peroxide in wood bleaching.

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| <input type="checkbox"/> NO. 8-1057 | <input type="checkbox"/> NO. 6-56 | <input type="checkbox"/> NO. 2-57 | <input type="checkbox"/> NO. 6-57 |
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Check 3633 opposite last page

CHEMICAL MATERIALS

Metal coating acrylic forms finish that's durable, glossy

Stable pigment dispersions, good adhesion obtained

Uses: An acrylic resin for metal coatings. Primary use has been in automotive lacquers.

Features: Product dries rapidly to clear, colorless film. Product shows outstanding pigment dispersion stability as well as gloss and fullness of polished films. In both air-drying and baking types of lacquer top coats, adhesion over a great many different surfaces is excellent.

Description: Coatings containing this acrylic can be reduced with aromatic solvents, ketones, and esters.

Physical Properties
Solids, % 30 ± 5
Lb/gal 7.85
Solvents 90/10: toluol/butanol

Acrylic resin is a clear, colorless liquid. It is compatible with a wide range of monomeric plasticizers. Two that have been most completely evaluated are butyl phthalate and dibutyl phthalate.

(Acryloid A-21 is a product of Rohm & Haas Co., Washington Sq., Philadelphia 5, Pennsylvania.)

Check 3634 opposite last page.

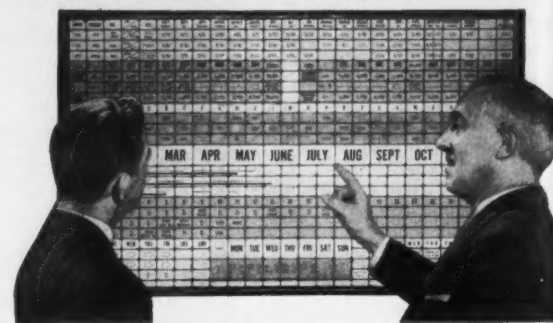
Catalyst supports show mechanical strength, chemical inertness

Uses: As catalyst supports in refining of petroleum products.

Features: Material has demonstrated good mechanical strength and chemical inertness.

Description: Mullite pellets are thermally fused spheres of combined alumina and silica, manufactured to the mineral formula of mullite - $3\text{Al}_2\text{O}_3 \cdot 2\text{SiO}_2$. In down-flow fixed bed reactors, these chemically inert pellets are used to support the catalyst beds, thereby preventing excessive pressure drop across the bed from an

How To Get Things Done



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Check 3636 opposite last page

CHEMICAL PROCESSING

CHEMICAL MATERIALS

accumulation of catalyst fines at the outlet of the reactor.

Pellets are available as irregular spheres in three standard size ranges: $\frac{1}{2}$ " to $\frac{3}{8}$ ", $\frac{5}{8}$ " to $\frac{3}{4}$ ", and $\frac{1}{2}$ " to $\frac{3}{4}$ ". Special graded materials of $\frac{1}{8}$ " variation are available within the limits of $\frac{1}{4}$ " to $\frac{3}{8}$ ". They are also available as mullite chips of 3-6 mesh and 6-10 mesh.

(Mullite pellets are product of Davison Chemical Co., Div. of W. R. Grace & Co., Baltimore 3, Maryland.)

Check 3637 opposite last page.

Accelerator price break permits use in resins of polyester-styrene

Uses: Accelerating the cure of polyester-styrene resins.

Features: Heretofore available only as a highly refined product, compound is now available in a technical grade priced to make use as accelerator economically feasible with polyester-styrene resins in low pressure laminating applications. Price is \$1.55/lb in drum quantities.

Description: Accelerator is N,N-dimethyl-p-toluidine. Amount required varies from 0.001 to 0.1% depending upon desired rapidity of cure. Most general purpose polyester-styrene resins will gel in approximately one minute at room temperature with use of 0.1% DMT and 1% benzoyl peroxide. Product is suitable for use as an accelerator in most peroxide-catalyzed reactions conducted in non-aqueous media.

(Accelerator DMT is available from Wallace A. Erickson & Co., 842 N. Wells St., Chicago 10, Illinois.)

Check 3638 opposite last page.

Terpene polymers, pale, non-yellowing products, available in solid or solution form, are subject of eight-page bulletin. Physical and chemical properties are emphasized, and chart covers compatibility, solubility, and viscosity. Application chart for various grades is included. "Piccolyte Resins" — Pennsylvania Industrial Chemical Corporation, Clairton, Pa.

Check 3639 opposite last page.



This balancing act is essential

...to get the right answers for your filtration

If you want optimum FLOWRATE, CLARITY and ECONOMY, "standard" recommendations are not your answer, because your filtration operations are probably a little different from any other. 99 times out of 100, one of the standard grades of Dicalite Filteraids will give you the clarity you require, economically, at fast flowrates. If not, one of the special grades will. But the real problem is to determine just which filteraid best meets your particular situation.

That's where your Dicalite service engineer comes in. Thoroughly versed in the unique science of filtration engineering, he brings to your operation both his technical skills and his first-hand experience with thousands of filtrations. His specialized knowledge charts a direct path among a host of variable factors. Often he is able to diagnose a problem on first hearing and to make correct recommendations. He works closely with your own technical staff and production people—in your own plant, if you wish. And, if your problem demands more extensive work, the research facilities of the Dicalite laboratories are at his—and your—disposal.

If you have been wondering about your own filtrations, why not call in this Dicalite expert... there's no obligation. Just call or write:

Dependable **Dicalite**[®]
GLC
GREAT LAKES
DIATOMACEOUS MATERIALS

DICALITE DEPARTMENT, Great Lakes Carbon Corp.,

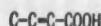
612 So. Flower St., Los Angeles 17, Calif.



Check 3640 opposite last page

Eastman Briefs

FOR FEBRUARY



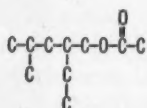
Crotonic Acid

Form crystalline solid
Crystallization Point not less than 65°C
Purity not less than 97%

If you're working with alkyds, take a good look at this highly reactive unsaturated acid. Reports are that it makes excellent fast-drying resins. Insecticide chemists have also shown considerable interest.

Eastman Chemical Products, Inc.
Kingsport, Tennessee

B1



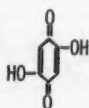
2-Ethylisohexyl Acetate

Form liquid
S. G. 20°/20°C 0.865-0.870
Boiling Range, 760mm. 186-195°C

Here's a new ester solvent with a very low evaporation rate and very low water solubility—a valuable combination of properties for multicolor lacquer and emulsion formulations, for instance.

Eastman Chemical Products, Inc.
Kingsport, Tennessee

B2



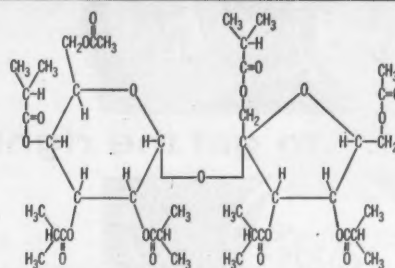
2,5-Dihydroxybenzoquinone

Form solid
Melting Point 216°C (Decomposes)
Quality Technical grade

From metal chelating to insecticide manufacture anyone interested in quinone compounds will find this one easy to work with—decidedly more stable than most and less irritating to skin and eyes.

Eastman Chemical Products, Inc.
Kingsport, Tennessee

B3



Sucrose Acetate Isobutyrate

In case you didn't receive an announcement, we have a healthy¹ new arrival at our place. Adhering strictly to family tradition we named this compact newcomer Sucrose Acetate Isobutyrate—SAIB, for short. Quite a mouthful, but then a perfectly clear young chemical² that empties a hot bottle in seconds³ and yet is spooned at room temperature⁴ deserves an impressive title.

We're not sure yet just what the future holds for our latest addition. Extremely stable character traits⁵ and early behavior patterns⁶ indicate a career in the coatings field. A smooth operator here, its ability to lower operating temperatures of hot melts, and increase the nonvolatile content of a lacquer without disturbing the viscosity or bothering film hardness might be a definite asset.

On the other hand we do not intend to limit young SAIB. We will continue to provide guidance and assistance, particularly during the early years; but anyone with opportunities who is interested in adoption should contact us immediately. We'll be more than glad to arrange an introduction and supply you with a complete case history.

¹ Molecular weight is 838.

² Maximum Gardner Color is 2.

³ Viscosity is 90 Centipoises at 100°C.

⁴ Viscosity is 100,000 Centipoises at 30°C.

⁵ Resistant to heat and hydrolysis.

⁶ Compatible with most resins, oils and waxes.

Eastman Chemical Products, Inc.
Kingsport, Tennessee

B4

Chemicals Division
Eastman Chemical Products, Inc.
subsidiary of Eastman Kodak Company
Kingsport, Tennessee

Please send more data on these chemicals:

B1 ☐ B2 ☐ B3 ☐ B4 ☐

Name _____

Title _____

Company _____

Address _____

Zone No. _____

State _____

CLIP AND FILE

CHEMICAL MATERIALS

Hardening agents not needed in epoxy compounds

Stability at room temperature is maintained

Uses: Impregnation of transformers and coils (unfilled compounds); and encapsulation of transformers, strain-sensitive toroidal coils, capacitors, and complete circuits (filled compounds).

Features: Compounds are ready to use without addition of hardening agents. They offer extended stability at room temperature.

Description: Single-component epoxy compounds are available as both filled and unfilled systems. They offer several degrees of flexibility, and heat resistance exceeding 150°C.

(Hysol 6700 Series single-component epoxy compounds are products of Electrical Insulating Division, Houghton Laboratories, Inc., Olean, N.Y.)

Check 3642 opposite last page.

Eliminates foam build-up in vinyl-acetate-based paints, coatings

Uses: Liquid defoaming compound for vinyl acetate formulations.

Features: Compound is claimed to be an efficient and inexpensive means of eliminating foam during manufacturing and application of vinyl-acetate-based paint and coatings.

Description: Liquid defoaming compound for vinyl acetate formulations is 100% active. In most applications, a concentration of 0.1% by weight is sufficient to handle the average foam problem. Compound will also eliminate foam build-up in emulsion and suspension polymerization of polyvinyl acetate, polyvinyl chloride, acrylics, and many other reactions.

(Foamtrol #103 is product of Arlen Chemical Corp., 338 Wilson Ave., Newark 5, N.J.)

Check 3643 opposite last page.

CHEMICAL PROCESSING

Check 3641 opposite last page

**Multi-functionality
marks rubber
additive**

Uses: As additive for prolonging rubber life.

Features: Chemical permits compounders to impart to rubber at one time a combination of properties which previously were not available in one rubber additive alone.

Description: Product is non-volatile, staining type combination stabilizer, antioxidant and antiozonant. According to manufacturer, it does not activate the cure of rubber stocks in processing stage. Its use permits for normal rubber processing without fear of premature cure and consequent waste.

Material adds deterioration resistance to unvulcanized retread stock. Tread rubber fortified with product can be stored for longer periods of time, and rubber breakdown from exposure to weather, heat, and ozone is reduced. In its solid state, rubber chemical is blue-brown flaked solid with an average melting temperature of 212°F.

(Wing Stay 100 is product of Chemical Div., The Goodyear Tire & Rubber Co., Akron 16, Ohio.)

Check 3644 opposite last page.

**Nitrile rubber adhesives'
tensile strength higher
with phenolic resins**

Uses: Material was developed for pressure sensitive, cold setting, and heat setting nitrile adhesives.

Features: Material makes possible production of nitrile rubber adhesives with good green tack, high tensile strength, and high thermal softening point.

Description: Heat-reactive phenolic resin is an oil soluble, crushed phenolic, characterized by extremely fast cure. It is completely compatible with nitrile rubber and soluble in aromatic or aliphatic solvents.

Physical properties are: Specific Gravity, 1.06-1.16; Melting Point (Capillary Tube Method), 150-165°F; Color (U.S.D.A. Rosin Standards) X or lighter.

Resin is usually used in quantities up to 100 parts of resin per 100 parts of rubber. Adhesives are made by mixing together solvent, premilled rubber, and resin or, by milling resin in rubber stock before cold cutting with solvent.

(SP-12 resin is product of Schenectady Resins Div., Schenectady Varnish Co., Inc., Schenectady 1, N.Y.)

Check 3645 opposite last page.



"Of course you'll be going into it cold..."



Ask for Bulletin 27

Wire Mesh Products

Cut engineering and production costs with Jelliff's facilities for precision-forming special filters and strainers in any quantity.

THE C. O. JELLIFF MANUFACTURING CORPORATION
SOUTHPORT, CONNECTICUT

SERVING INDUSTRY
FOR 78 YEARS



Check 3646 opposite last page



Bauer Portable Magnetic
Separator No. 238

• You can be sure of removing unseen rust, scale and other ferrous metal particles with the adjustable, high intensity permanent magnetic separator shown above. Needing no electrical connections, this model can be used any place on the picking table, on belts up to 72" wide. It is capable of lifting ferrous pieces from a moving layer 1½" deep and is completely rust proof.

• For details on the complete line of Bauer magnetic separators, including water-tight recessed air-gap separators for chutes and magnetic grates, ask for bulletin M-3-B.

THE BAUER BROS. CO. 1719 SHERIDAN AVENUE
SPRINGFIELD, OHIO

Check 3647 opposite last page

TOWER PACKING

All the facts about HARSHAW *tellerettes*

Contained in this comprehensive booklet discussing the application of Harshaw Tellerettes to tower packing.

Subjects discussed at length (accompanied by pertinent charts)

1. The Tellerette Shape
2. Physical Characteristics
3. Lower Capital Investment and Operating Cost
4. Low Weight
5. Reduced Tower Height
6. Increased Tower Capacity
7. Support Plates
8. Corrosion Resistance
9. No Clogging

THE HARSHAW CHEMICAL CO.

1945 East 97th Street, Cleveland 6, Ohio

Branches in Principal Cities



Send today for your free copy... Use this convenient coupon!

THE HARSHAW CHEMICAL CO.

1945 EAST 97TH STREET
CLEVELAND 6, OHIO

Please send me _____ copies of your booklet, "Harshaw Tellerette"

Name _____

Company _____

Street Address _____

City _____ Zone _____ State _____

Check 3648 opposite last page

CHEMICAL MATERIALS

**Compatible plasticizer
low in odor, color,
and cost**

Resists extraction and migration

Uses: As fast-blending polymeric plasticizer for permanent flexibility in broad range of general-purpose polyvinyl chloride applications.

Features: Compound is described as highly resistant to extraction and migration. It is said to be low in both odor and color, and highly compatible under humid conditions.

Description: Polymeric plasticizer is derived from adipic acid and has a molecular

Typical Properties

Color, Gardner	1
Pour point, 0°F.	40
Viscosity, poises at 25°C.	30
Pounds per gallon, 25°C.	9.04

weight exceeding 2000. Available in commercial quantities, compound is said to have high efficiency, electrical resistivity, and permanence under heat aging.

(Santicizer 409 is product of the Monsanto Chemical Co., St. Louis 24, Missouri.)

Check 3649 opposite last page.

**Polymeric plasticizers
extremely durable
and adaptable**

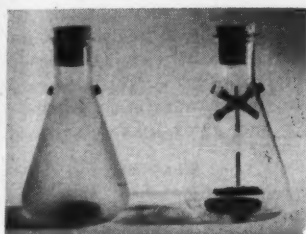
Retain original properties at high temperatures

Two polymeric plasticizers — characterized by extreme durability as primary agents or in blends with monomeric-type plasticizers — have been developed. Light-colored material lend themselves to adaptations more readily than earlier polymeric types, according to manufacturer.

Elastex 37-R plasticizer is high-molecular-weight material specifically designed for vinyl compounding. Resin compounds retain their original properties at high temperatures and are unaffected

by kerosene, oil, and soapy water.

Elastex 36-R plasticizer is medium molecular weight material developed for more general use. It shows excellent durability as well as superior handling and processing properties when compounded with nitrile elastomers. This is



Plasticizer's thermal stability resists fogging in vinyls (right). Cloudy flask (left) contains vinyl compounded from conventional plasticizer. Both were subjected to intense heat

equally true when material is combined with monomeric-type plasticizers in polyvinyl chloride. It has outstanding ability to resist extraction by aliphatic and aromatic hydrocarbons.

(Elastex 36-R and 37-R plasticizers are products of Plastics & Coal Chemicals Div., Allied Chemical Corp., 40 Rector Street, New York 6, New York.)

Check 3650 opposite last page.

Purer calcined alumina with new process

Ferric oxide content reduced to 0.04% maximum

Uses: In refractories, ceramic processes, and as abrasive in buffing, polishing.

Features: Iron contamination is reduced to maximum 0.04% content of ferric oxide.

Description: New process grinds alumina by directing streams of it at each other. Product is available as white calcined grade R2003, analyzing 99.8% through 325 mesh.

(Calcined alumina is a product of Reynolds Metals Company, Richmond 18, Va.)

Check 3651 opposite last page.

HOW *HERCULES* HELPS...

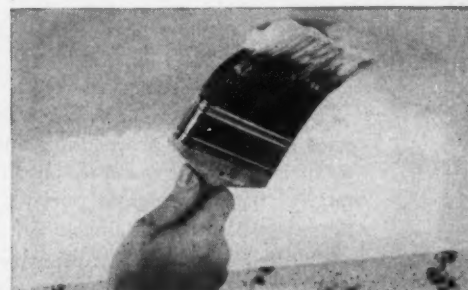
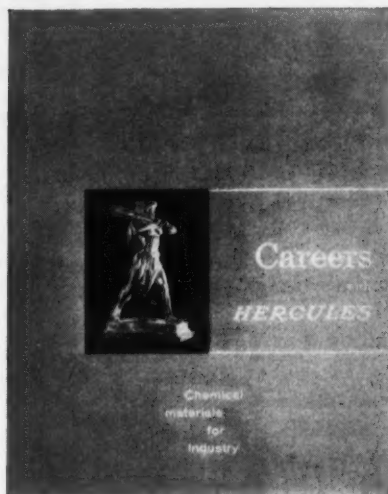


AIRPORTS FOR THE JET AGE—A record billion dollars will be spent in 1959 on new and enlarged military, municipal, and private airports to meet air transport and defense needs. Hundreds of miles of lengthened, widened runways

to handle jet liners will be built with "air-entrained" concrete for greater durability. Vinsol® resin air-entraining agent has been widely specified for such uses since the concept was introduced by the cement industry in the 1930's.

TECHNICAL GRADUATES—

This year's seniors who are interested in a career in the chemical industry will find this new booklet a complete explanation of opportunities at Hercules. The company's growth, its diversified products and markets, its training program for new employees, are all covered. Inquiries from qualified students will receive prompt attention from our Personnel Department, which uses the booklet in their recruiting program with college placement offices.



MAKE PAINTING EASY—Today's new "dripless" or gelled paints make painting anything, even ceilings, practically a pleasure. T. F. Washburn Co. of Chicago relies on Hercules Improved Technical PE as an essential ingredient in its patented Burnok vehicle. The Burnok vehicle, made with this quality pentaerythritol, gives full viscosity control, produces a paint that brushes easily and covers completely with a minimum of dripping.



059-1

HERCULES POWDER COMPANY

INCORPORATED

900 Market Street, Wilmington 99, Delaware

HERCULES

Check 3652 opposite last page

Water Purity

• FOR EVERY NEED •

American Sterilizer WATER STILLS

- * ½ to 500 gallons per hour Evaporator capacity range.
- * Steam, Electric or Gas heated installations . . . Kerosene or Gasoline heated Portable Units.
- * Fully automatic or manual controls.
- * Single, Double and Triple distilling systems.
- * Storage Tank capacities from 5 to 1000 gallons.
- * All internal parts heavily coated with pure block tin. Stainless steel, Aluminum or special alloys also available.

Thousands of Amsco Water Stills in laboratories, industrial or processing plants and hospitals throughout the world are producing distilled water of the very highest purity . . . economically, dependably and efficiently.

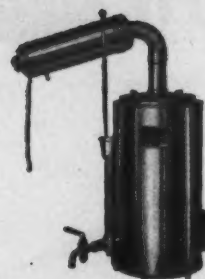
Whether the distillate quantity is small or large . . . for exacting laboratory experiments, or for mass processing . . . the purity of water is the same, exceeding the standard set up by the United States Pharmacopeia.

Whatever your water conditions or distillate requirements there is an Amsco distilling system especially adapted to your needs. Write for detailed information . . . Bulletin IC-601.



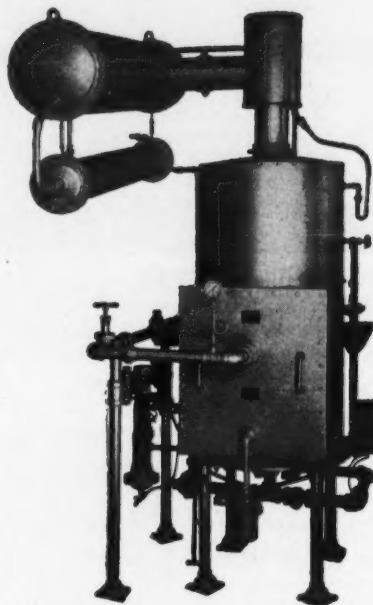
**AMERICAN
STERILIZER**

ERIE • PENNSYLVANIA



Typical Laboratory Still:
Electric heated. ½ to
10 gallons per hour
capacity.

½ to 500 gallons per hour



Typical Industrial Unit: Mass production
steam heated Still with automatic con-
trols. 50 to 500 gallons per hour capacity.

Deionizers . . .

5 to 1000 gallons per hour . . . with
cation or anion resin in single bed
or dual bed arrangement.

INDUSTRIAL and SCIENTIFIC DIVISION

Check 3653 opposite last page

CHEMICAL MATERIALS

Pigment development features opacity, brightness

Has good resistance to heat,
bleeding

Uses: Material is recom-
mended as pigment for plas-
tics, paints, and printing inks.

Features: Pigment has bright
shade and is very opaque. Its
heat and bleed resistance are
claimed to be very good.

Description: Metallic salt
azo red pigment is easy grind-
ing and gives inks with good

Properties

Specific Gravity	1.59
Weight Per Solid Gallon (lb)	13.24
Bulking Value (gal per lb)	0.07553
Oil Absorption	38.

body and flow. It is claimed to
be a good color for polysty-
rene, both regular and high
impact, since it shows little or
no coloration even for one
hour at 600°F.

(Orion Red CP-1300 is product
of Pigment, Color & Chemical
Div., The Sherwin-Williams
Co., 260 Madison Ave., New
York 16, N.Y.)

Check 3654 opposite last page.

New purification process produces ethylene urea in pure form

For the first time, cyclic
urea is being made available
in pure, dry form. Manufac-
turing and purification process
developed to produce ethylene
urea in pure form will provide
large scale tonnage produc-
tion.

A colorless, odorless, neu-
tral solid which is easily and
clearly soluble in water,
methanol, ethanol, etc., this
purified ethylene urea is also
available in the form of an
aqueous 40% solution. A
slightly less purified form of
ethylene urea which has a
40% aqueous solution is also
being produced.

(Cyclo-ethylene urea is avail-
able from Metro-Atlantic Inc.,
Centredale 11, Rhode Island).

Check 3655 opposite last page.

CHEMICAL PROCESSING



Control of bottoms from fluctuating columns and overall operations have been greatly improved at Shell Oil Co. where . . .

Continuous Initial Boiling Point Recorder Replaces Intermittent Laboratory Tests

THEODORE W. WEIT

Associate Editor

with **C. C. WUTH**, Chief Engineer
Shell Oil Company
Wood River, Illinois

Problem: Control of fractionating columns on toluene and alkylation units at Shell Oil's Wood River refinery requires determination of initial boiling point of bottoms. Until approximately two years ago, samples had to be analyzed in the laboratory several times a day. This took at least three to four hours.

Cut point in running fractionating columns is determined by initial boiling point of bottoms stream. To meet specifications, this must be controlled within a narrow range.

Solution: In May 1956, Shell engineers installed a newly developed instrument (invented at Shell Development Company, U.S. Patent #2,594,683) on the bottoms stream from a toluene column.

Operation of Instrument

About 5 cc/min of sample constantly enters instrument through a rotameter. A constant differential-pressure flow regulator controls sampling rate. Constant heat input to sample, by means of a 50-watt cartridge heater, boils off lightest boiling material in sample.

Boiled vapors rise, contact thermocouple tip, are condensed, and return to liquid

section in bottom of boiler. Cooling water is circulated through the condensing jacket at a constant rate determined by a rotameter. Only material boiling at the initial boiling point of the sample reaches the thermocouple. The thermocouple temperature is then transmitted to a recorder.

Accuracy of Instrument

Early correlations between instrument readings and labo-

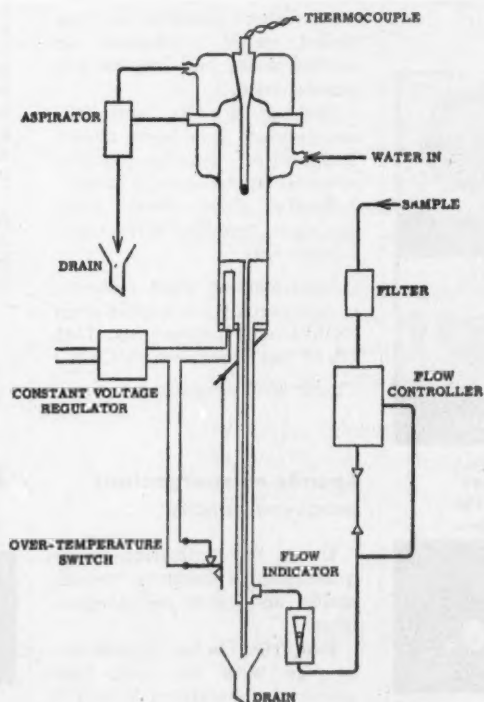
ratory data showed that the instrument was reading 4°F above initial boiling point laboratory had determined.

It was decided that this average difference could have been caused by differences in configuration of plant and laboratory test apparatus or by thermo lag of laboratory thermometers. Laboratory readings are taken while temperature is rising, whereas instrument thermocouple is near thermo equilibrium at all

times. Lowering IBP recorder pen 4°F eliminated difference between instrument and laboratory readings.

Instrument now agrees with laboratory results within reproducible accuracy of the laboratory test.

Desirable accuracy and reliability of the IBP instrument led to trail of automatic IBP control. A pneumatic controller was added to the recorder. Recorder-controller output was connected pneumatically



Systematic diagram
of initial boiling
point transmitter

Installation of initial
boiling point trans-
mitter at Shell's
Wood River refinery



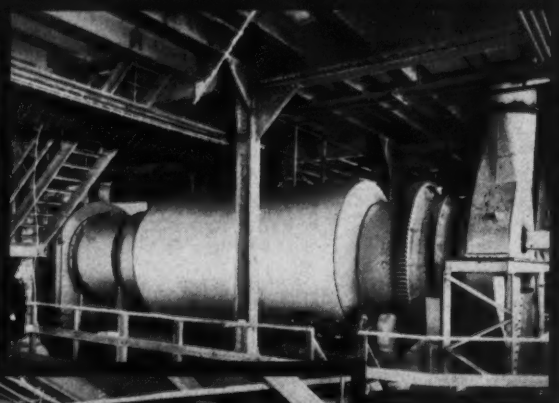
RENNEBURG

PROCESS EQUIPMENT

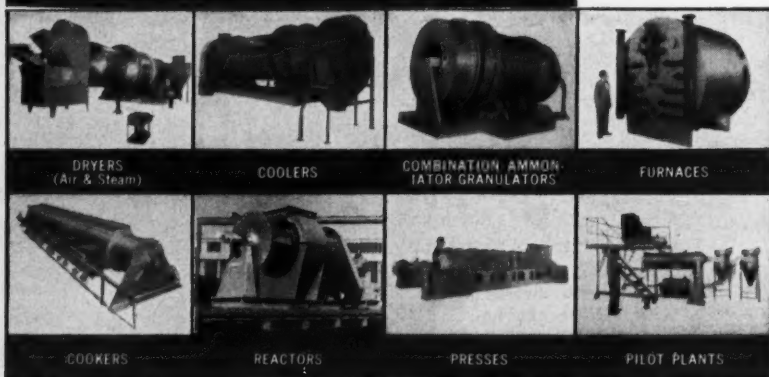
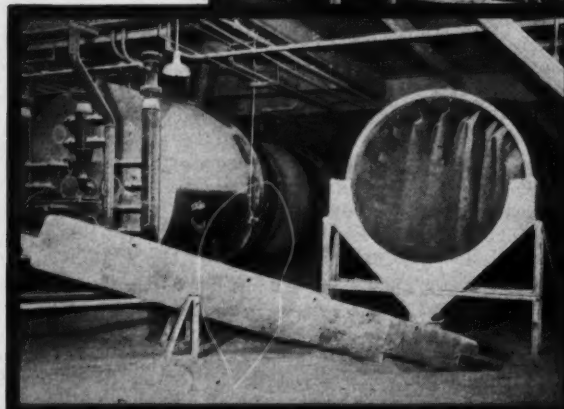
for the Chemical Industry

SERVING THE
PROCESS
INDUSTRIES FOR
OVER 80 YEARS

Renneburg
DehydrO-Mat Dryer
—Produces top
quality fish meal at
lowest operating cost.
This compact unit
is made in sizes to
handle all capacities.



Renneburg
24,000,000
BTU/Hr capacity
Refractoryless
Furnace used with
8' dia. x 60' Dryer
(at left of photo)
parallel with 8' dia.
x 60' Counter-
Current Cooler.
Note how effectively
the flights shower
the material for
maximum cooling
efficiency.



KILNS • COMBUSTION EQUIPMENT • CALCINERS • FANS • COLLECTORS
AIR POLLUTION CONTROL SYSTEMS • AMMONIATORS* • GRANULATORS*
PUG MILLS • EVAPORATORS • MIXERS • ELEVATORS • CONVEYORS • ROASTERS

*TVA Licensed Manufacturer

Literature and information on request

Edw. Renneburg & Sons Co.

2839 BOSTON STREET, BALTIMORE 24, MD.

INSTRUMENTS & LAB

to control heat input to the unit. Although a proportional band of about 600% is required in the IBP controller for stability, the system has proven reliable. It consistently holds the bottoms product IBP within $\pm 2^\circ\text{F}$.

The IBP transmitter costs about \$2250. With recorder controller and installation costs, complete IBP control system (exclusive of column temperature control system which existed) costs \$3500.

Results: Operation of system has been such that about 40-50 barrels per day of product have been upgraded. Carry-over of better grade products in the bottoms has been reduced.

Time lag between column changes and necessary operating adjustments has been reduced from more than 8 hours to less than one hour. Number of routine samples sent to laboratories has been greatly reduced also. Laboratory results are now used only as a check on performance of instrument.

Maintenance

Most maintenance originally resulted from dirty cooling water. Steam condensate was not readily available. However, later installations use cooled steam condensate as cooling water and require less maintenance.

Besides water problems maintenance has been minor. Transmitter usually requires cleaning about once a week.

Shell's Wood River plant has since installed three more instruments.

(Initial boiling point recorder is commercially available from Hallikainen Instruments, 1341 7th Street, Berkeley 10, Calif.)

Check 3657 opposite last page.

Specific microorganisms produced quickly

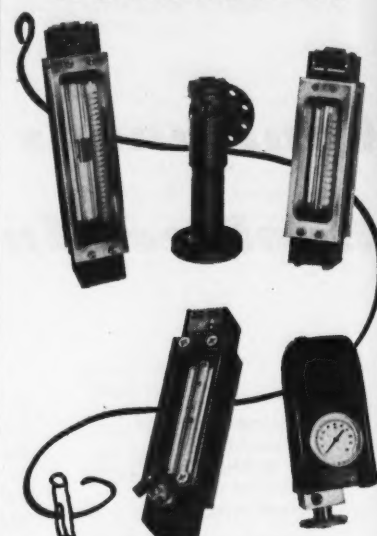
Uses: For culturing large quantities of bacteria, yeasts, molds, and other microorganisms.

Features: On one typical 10-hr run with the unit, 1400 grams wet weight of *E. coli* B cells was produced.

BROOKS LEADERSHIP

achieved through design

ROTAMETERS

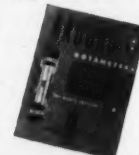


a FULL LINE
for every service

Whatever your flow measurement or remote transmission needs ... Brooks has the answer. Moreover, it is a *practical* answer ... because the same practical design features are carried through the line. From Hi-Accuracy Flow Indicators to low-cost purge meters ... from the well-known Ar-Met Armoured Meter to the new convertible electric or pneumatic flow transmitters, you'll find these common features: self-alignment of essential parts, simplified cleaning and assembly, and designs that eliminate troublesome line strain on the metering elements.

You can depend on Brooks rotameter equipment for *lowest final cost* all down the line—because it has been performance-proven where it counts most: in daily service.

Send for your copy of Bulletin 110b, a brief, well illustrated guide to Brooks Rotameters and Accessory Equipment.



BROOKS ROTAMETER COMPANY

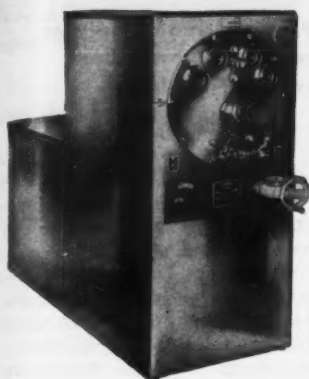
259 A Street, Lansdale, Pa.



the new standard of
flow measurement
and control

Check 3658 opposite last page

CHEMICAL PROCESSING



Aids research through production of cultures

Description: Unit consists of a double-walled, cylindrical stainless steel chamber 16" in diameter and 30" in length. This houses a rotating agitator with aeration fins. Controls governing sterilization, agitator speed, and other variables are located on front.

In operation, a culture of microorganisms is inoculated into prepared sterile medium of mineral salts and sugars. These organisms multiply rapidly within chamber until desired population is reached. Pump then adds liquid nutrient and withdraws bacterial suspension at an equal rate through a cooling bath and ultimately into a centrifuge where the cells are harvested.

(Biogen culturing apparatus is product of American Sterilizer Co., Erie 6, Pa.)

Check 3659 opposite last page.



"We've put in so many miracle ingredients there's no room for the product."

In Florida power plant...
**quantichem analyzer
 records dissolved oxygen
 colorimetrically
 0 to 30 ppb.**



EVEN a few parts per billion of dissolved oxygen in water for power station boilers reduces overall efficiency and economy. Three months ago, the Florida Power Corp., St. Petersburg, Fla., put on stream a Milton Roy Quantichem colorimetric analyzer in its Bayboro Station to survey dissolved oxygen in returned condensate from steam turbine condensers.

In addition to this application, other Quantichem automatic analyzers are available for analyses of silica (0-50 ppb), residual chlorine (0-3 ppm), hardness (0-3 ppm) . . . as well as for phosphates, hydrazine, chlorides, and many others.

Write for information on your particular application.
 Milton Roy Company, 1300 East Mermaid Lane,
 Philadelphia 18, Pa.



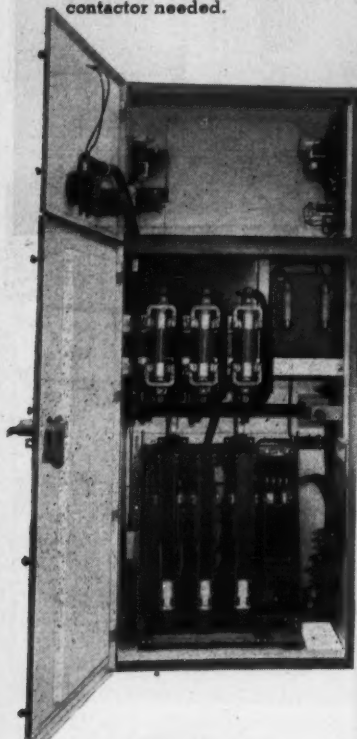
Controlled Volume Pumps
 Quantichem Analyzers • Chemical Feed Systems

Check 3660 opposite last page

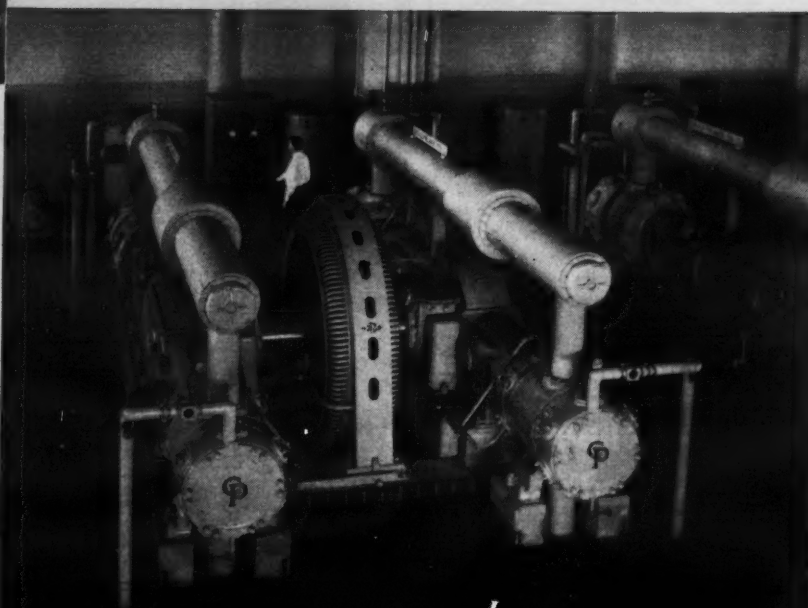


Above and at right • Four EC&M 1000 HP, 2300 Volt Synchronous Starters on air-compressor drives in Chrysler Corporation's new Ohio Stamping Plant at Twinsburg. Purchased and installed by Hatfield Electric Co., Cleveland, Ohio.

Below • Inside view of starter showing compact arrangement of fuses and contactor. The three arc shields slide out for quick access to both front and rear contacts—no draw-out of contactor needed.



The most complete synchronous motor protection you can buy



EC&M 2200-4800 VOLT STARTERS

• A push of the "start" button gives you complete protection during starting and running—*plus EC&M fully automatic synchronization.* Throughout the entire sequence, motor windings are completely protected and synchronization occurs at the most favorable time. Should the motor pull out of step because of voltage dip or overload, the field is automatically removed. Re-synchronization occurs when the motor re-accelerates the load. Short circuit protection is provided by current-limiting power fuses working in conjunction with EC&M's "certified" high-interrupting-capacity ZHA air-break contactor.

For complete details...

WRITE FOR BULLETIN 8210



THE ELECTRIC CONTROLLER & MFG. CO.

A DIVISION OF THE SQUARE D COMPANY
CLEVELAND 28 • OHIO

INSTRUMENTS & LAB

Process stream analyzer continuously monitors refractive index

Overcomes temperature variation effect

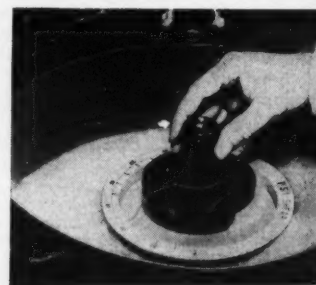
Uses: In continuous plant stream monitoring of liquid stream index of refraction.

Features: Differential refractometer overcomes a major difficulty in making continuous refractive index measurements — large variations with temperature.

Description: Key to instrument's insensitivity to effects of temperature is cell assembly. This consists of an inner cell and outer cell so arranged there is no refraction except at one surface where light emerges from inner cell into outer cell. Design is such that absolute temperature control is not necessary to give measurements of reproducible accuracy to 6 decimals. Either cell may be used as part of process line, eliminating need for sampling lines or system. Or, a reference liquid may be in inner cell.

(Differential refractometer is available from Greenbrier Instruments, Inc., Ronceverte, West Virginia.)

Check 3662 opposite last page.



Shear test device

... for measuring yield stress and thus correlation parameters of stock sample. Instrument resulted from work by TAPPI Hydraulics Committee.

(Shear Tester is product of Fischer & Porter Co., 824 Jacksonville Rd., Hatboro, Pennsylvania.)

Check 3663 opposite last page.

Check 3661 opposite last page

**For lab or pilot plant—
small batch mixer**

Uses: For blending applications in lab or pilot plant.

Features: Units are full fledged production machines with integral motor drive and controls. Tilting device allows mixer to be elevated for charging. Disk-type discharge gate effectively seals mixer during mixing cycle. Discharge is effected by operating quick acting screw on discharge gate.

Description: Small rotary batch blender is junior version of company's rotary batch mixer. Models are offered in 5-, 10-, and 15-cu ft capacity for material weighing up to 60 lb per cu ft. Blender may be obtained with quick opening doors, in drum and flush ports for cleaning. Mild or stainless steel construction is available; also internal spray attachment for introduction of liquid additives during mixing cycle.

(Small rotary batch blender is product of Munson Mill Machinery Co., Seward Ave., Utica, N.Y.)

Check 3664 opposite last page.

**Sensitive switch acts
with small increments
of pressure**

Uses: For alarm signalling and/or control involving pressure, vacuum, differential pressure, flow and liquid level.

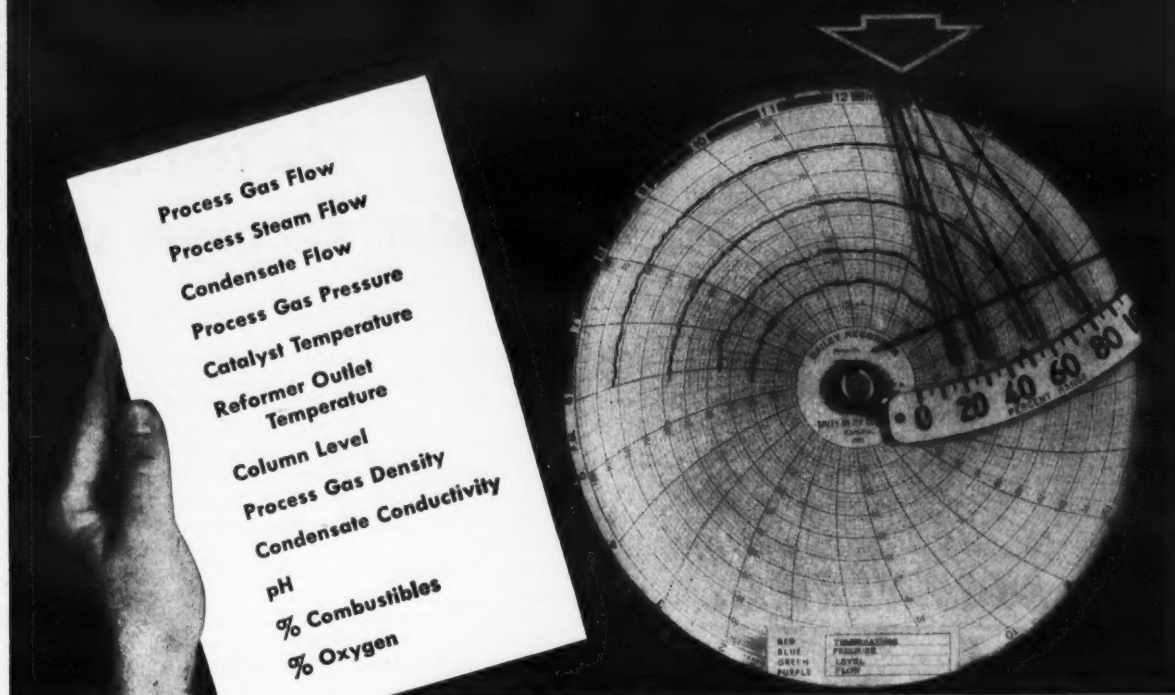
Features: Sensitive pressure switch gives make-or-break control sensitivity of 0.005 in. of water with dependability.

Description: Consisting of a contactor manometer and a relay-power-supply package, instrument can sense pressure increments as small as 0.003 oz per sq in. Switching functions are handled by the relay-power-package. Operating on 110v AC, unit uses interchangeable plug-in circuit cards which govern contact point on manometer.

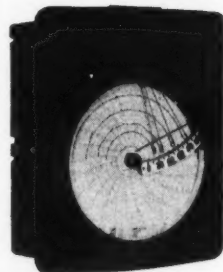
(Manotac is product of Meriam Instrument Co., 10710 Madison Ave., Cleveland 2, O.)

Check 3665 opposite last page.

Record any 4 on 1 chart!



To give your operation "FOUR-IN-ONE" efficiency... The BAILEY Receiver Recorder-Controller!



Records four variables
on one chart.

You can lower the cost of your equipment investment and increase the efficiency of your entire operation with the Bailey Receiver Recorder.

HERE'S HOW

The interchangeable components for the Recorder make it fast, inexpensive, and automatic to do up to *four* measuring jobs at the same time with either or both pneumatic and electric systems.

This Bailey unit continuously and simultaneously records four variables on the same

chart. And, they are in the same linear scale measurement. You have clear, easy-to-read records for continual analysis and control.

Plug-in, pre-calibrated receivers can easily be adapted on-the-job to revised process requirements. The Bailey Receiver Recorder saves you money with a minimum instrument investment for process cycle expansion or alteration. Let your local Bailey engineer suggest applications to fit your operation. Or write for specific control systems information for your entire plant operation.

CM105-1

Chemical and petroleum division

BAILEY METER COMPANY

1074 IVANHOE ROAD • CLEVELAND 10, OHIO

In Canada—Bailey Meter Company Limited, Montreal



Check 3666 opposite last page



MAGNETROL

**The Simplest, Most Versatile
LIQUID LEVEL CONTROL
Ever Devised!**

Linked to liquid level by infallible magnetic force, Magnetrol is free from the limitations inherent in mechanical or electrical controls. With the actuating magnet rated at 98% of initial strength after 30 years, Magnetrol has *infinite operating life*, with practically no maintenance at all. There are no wearing parts to get out of order.

What's more, Magnetrol's simple operating principle permits easy, economical modification of standard units to meet *any* pressure, temperature or corrosion requirements. That's why there's practically no limit to Magnetrol's use. It's also why "specials" are likely to be standard with us. Magnetrol units control level changes from .0025-in. to 150-ft.—with single or multi-stage switching.

MAGNETROL, Inc.

SEND COUPON FOR DETAILS

MAGNETROL, Inc. 2159 S. Marshall Blvd., Chicago 23, Illinois
Please send me catalog data and full information on Magnetrol Liquid Level Controls.

Name _____
Company _____
Address _____
City _____ State _____ Zone _____

PROCESS INSTRUMENTATION and LABORATORY APPARATUS

This automatic flow control system devised for paper mill use does NOT use Venturi tubes and flow nozzles. And — tests in two mills on four paper machines prove the system works on a production-line basis

Low-cost orifice plates meter 3% paper stock—successfully

Problem: In manufacture of newsprint and other paper products, paper stock flow to paper machine must contain a definite percentage of sulfite pulp in relation to ground wood. Usually measured amounts of ground wood and sulfite stock are mixed in a common tank. The batch is then sent to the paper machine.

Frequently, continuous stock flow proportioning is used, based on Venturi tubes and flow nozzles as primary elements. However, Venturi tubes and flow nozzles are expensive and often difficult to install and service quickly.

Solution: An ideal solution to the problem could be use of orifice plates as low-cost, easy to install, easy-to-maintain primary elements — but the suggestion has been rejected by many paper mills

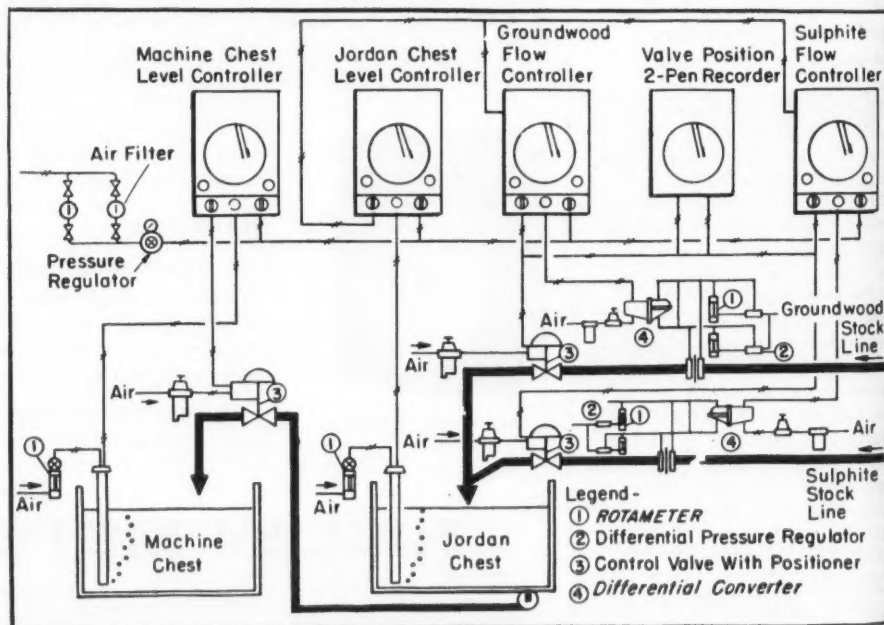
because engineers believe stock would build up behind the plates and distort metering.

However, engineering personnel of two mills on the West Coast of the United States and Canada believed orifice plates could work. The stock handled was three percent consistency with flow characteristics same as water. Four orifice plate systems were designed and installed.

Concentric Orifice Plates Used

Concentric orifice plates were used with d/D ratios of about 80 percent to prevent possible buildup of stock on upstream face of plate.

Vena contracta taps were tested on one installation, and flanged taps on another, both with excellent results. All taps were



This system for metering and ratioing paper stocks by use of orifice plates is in successful use in two West Coast paper mills

Check 3667 opposite last page

CHEMICAL PROCESSING

water-purged to prevent clogging. Differential pressure regulators in each water-purge system maintained a constant pressure across a rotameter and eliminated any measuring system errors from changes in water pressure.

How System Works

As shown, overall system consists of machine level controller, a Jordan chest level controller, two ratioing flow controllers in stock lines, and a two-pen valve position recorder to provide a continuous operational record of ratioing valves.

Machine chest level controller uses a bubbler system. It controls a valve in the line drawing stock from the Jordan chest.

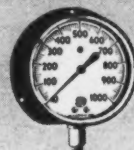
Output air pressure from Jordan chest level control unit, also a bubbler system, positions pneumatic remote index setting units in the stock flow meters. These measure and control the actual amount of stock that will flow. Ratio between two stocks — sulfite and ground wood — is maintained by manual settings.

Of particular importance is that the two-pen valve position recorder shows on one chart the air pressure applied to both flow control valves. Significance is that the slightest deviation of these valves from proper performance will change the ratio of stocks mixed.

Flow-meter controllers which measure stock flows use differential pressure transmitters as measuring devices. Particular transmitters used were selected because of adjustable ranges. Since ratio system is calibrated for single set of conditions, mainly ground wood and sulfite stock consistencies and flow rates, change in rate of flow requires adjustment of ratio system.

Pinch-type control valves with positioners were originally used in stock lines. Later research showed that butterfly or other stock control valves would be more suitable.

To page 79



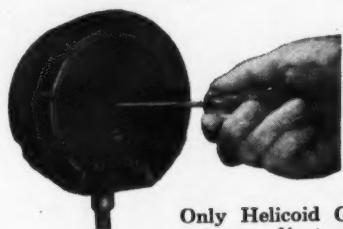
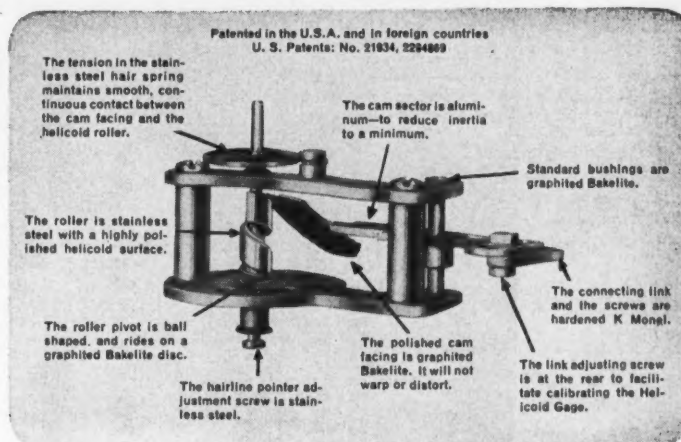
NOTHING BUT THE BEST IN GAGES FOR WORKING PRESSURES FROM 30" VACUUM TO 10,000 p. s. i.

These details of Helicoid gage design assure longer life and enduring accuracy

The superiority of Helicoid Gages is most evident in severe service—wherever a gage is subjected to violent pressure pulsations or severe mechanical vibrations.

The *sustained accuracy* of Helicoid Gages over *millions of cycles* is explained by the details of design and construction of the Helicoid movement shown at the right.

Rolling action of the cam facing against the roller surface... graphited Bakelite bushings, roller pivot base and cam facing... K Monel connecting links and screws... all such Helicoid features protect against wear and corrosion and assure sensitivity, sustained accuracy and trouble-free operation through millions of cycles.



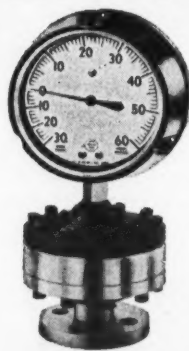
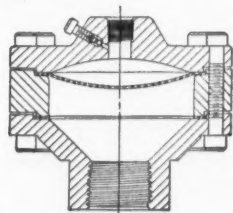
EASIEST ADJUSTMENT AND CALIBRATION

Only Helicoid Gages have the external pointer adjustment pictured here. The Helicoid type adjustment cannot be jarred out of position.

Calibration of Helicoid Gages is accomplished easily, without removing dial or pointer, because the link adjusting screw is at the rear of the system.

THE CHEMICAL GAGE

The Helicoid Chemical Gage has a guaranteed accuracy of plus or minus 1%. It is applicable for working pressures from 30" vacuum to 5000 p.s.i. and temperatures to 400° F. It is particularly suitable for chemicals and other viscous fluids which might clog or corrode a Bourdon tube. Pressure and/or vacuum is transmitted directly to the indicating gage element through deflection of a Teflon or Kel F sealing diaphragm. The indicating system above the diaphragm is filled completely with specific inert liquids.



TUBES BUILT FOR MILLIONS OF PRESSURE PULSATIONS

To fit the wide range of applications, Helicoid Bourdon tubes are available in four materials—alloy steel, K Monel, stainless steel and phosphor bronze.

All Helicoid tubes are made from seamless tubing and are carefully designed to give maximum torque and minimum stress. When used within the dial range, they will withstand many millions of pressure pulsations and will not stretch, leak or crack.



For complete information on the Helicoid line of gages write for Catalog G-52

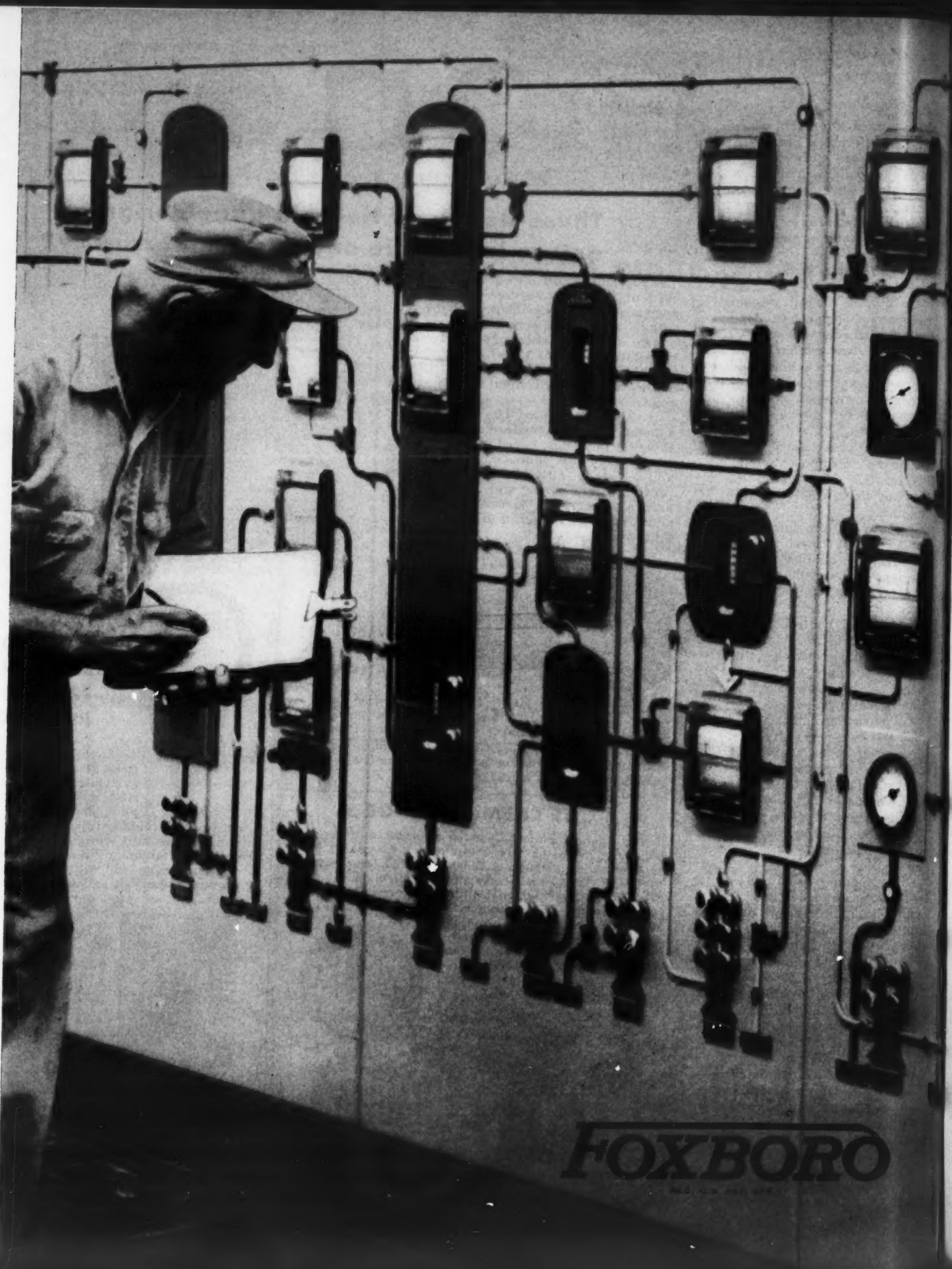
**Helicoid Gage Division
AMERICAN CHAIN & CABLE**

929-P Connecticut Avenue • Bridgeport 2, Connecticut



Helicoid gives you all these features at prices that are competitive in the quality gage field

Check 3668 opposite last page



Sun Oil Company reports:

"TWO YEARS OPERATION— AND WE HAVEN'T HAD A CONSOTROL* OFF THE PANEL YET"

Not only by their unvarying dependability of control, but also through unusual economy of maintenance, Foxboro pneumatic Consotrol Recording Control Stations have proved a profitable investment for Sun Oil Company at Marcus Hook, Penna.

Over two years ago, 129 pneumatic Consotrol instruments were installed as complete instrumentation for the control rooms of the ammonia plant and the Houdrifiow catalytic cracking unit in this modern Sun Oil refinery. In continuous operation ever since, not a single Consotrol Recorder or Controller has yet needed recalibration or realignment!

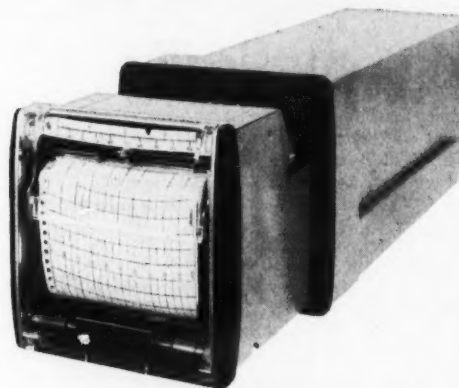
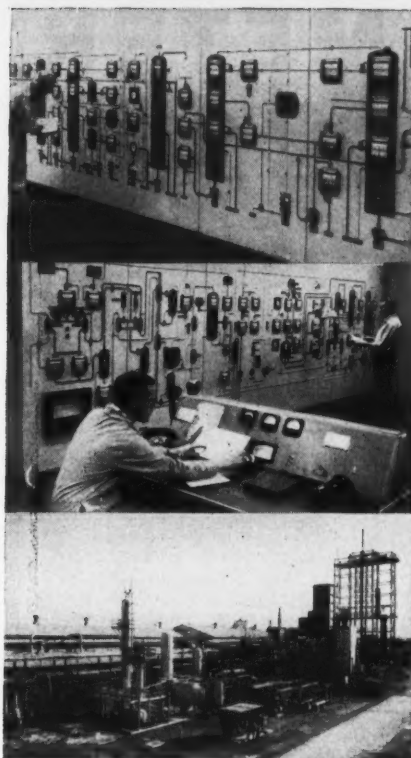
Add to this the fact that Consotrol Recorders need replacement of their full-scale, 4-inch strip charts as infrequently as once a month — re-inking only twice a year — and it's easy to understand why Sun Oil men at Marcus Hook are more than satisfied with Consotrol equipment.

Get the full story of these ultra-dependable Recording-Controllers before you design your next control system. Write for Consotrol Bulletin 13-18. The Foxboro Company, 812 Neponset Avenue, Foxboro, Massachusetts.

*Reg. U. S. Pat. Off.

CONSOTROL INSTRUMENTS

Check 3669 opposite last page



Each pneumatic Consotrol Control Station consists of a Recorder with M/58 Controller integrally mounted at rear. Complete station pulls out from front of panel, as shown above.

SHOWN OPPOSITE is part of graphic control panel for cracking unit at Sun Oil Company, Marcus Hook, Penna. All panel instruments were supplied by Foxboro.

Flow Control

From page 77

Results: Application of the orifice plate control system has allowed these two mills to continuously and automatically control ratio and flow of mixed stocks without expense and trouble of Venturi tubes or flow nozzles. Also, the work has proven conclusively that orifice plates can be used successfully to meter and ratio paper stocks on a production basis.

(Control systems are product of Industrial Division, Minneapolis-Honeywell Regulator Company, Wayne and Windrim Avenues, Philadelphia, Pennsylvania.)

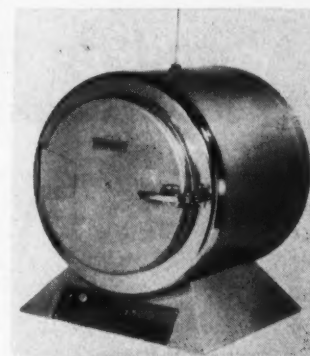
Check 3670 opposite last page.

'High style' of oven assures uniform heat

Uses: As a laboratory oven for temperatures to 250°C.

Features: "High style" of oven assures uniform heat with no cold corners.

Description: "Circle-of-heat" oven design is achieved



Round design of oven eliminates cold corners

with use of inner aluminum shell. This conducts heat from heaters to working chamber. Work chamber is 13" deep by 15" in diameter. Chamber is double walled and insulated. Operation is either on 115 or 230 volts.

(Circ-O-Therm oven is product of Hevi-Duty Electric Co., Milwaukee 1, Wis.)

Check 3671 opposite last page.

HOW TO METER

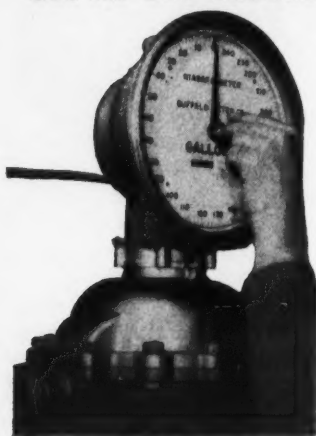
Hard to Handle Liquids



Bottle washing plant of large brewery

and do it Automatically

Set for 175 Gallons



Get 175 Gallons

BUFFALO METER COMPANY, Incorporated

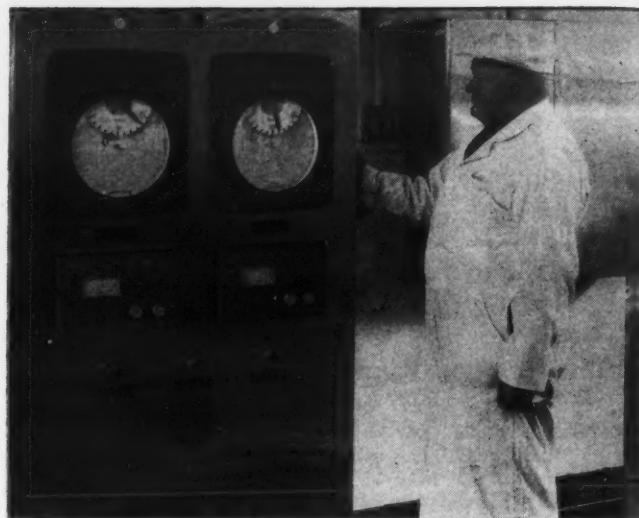
2892 MAIN STREET • BUFFALO 14, NEW YORK

That was the problem at a large brewery. The liquid was caustic soda. It had to be measured accurately and added to the water in the bottle-washing machine to remove labels and foreign matter.

The liquid caustic was stored in two large tanks. By piping the liquid through Niagara Electriccontact Meters, it was only necessary for the operator to set the meter dial hand to the desired number of gallons of caustic, then press a push button to start the delivery to the washing machine. Upon delivery of the preset quantity, the switch in the Electriccontact Meter closes a solenoid to stop the flow of caustic. Simple . . . accurate . . . and fool-proof!

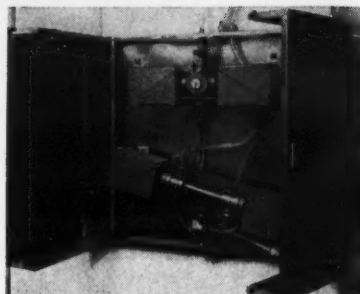
Let us show you how to solve your liquid metering problem to give you cost-saving, time-saving accuracy by automation. Write for complete information.

PROCESS INSTRUMENTATION and LABORATORY APPARATUS



These two recording turbidimeters monitor both influent and effluent of final polish filtration at brewery

Sensing elements of the two turbidimeters are shown at back of panel. Note inclined flow cell of longer tube at bottom, which prevents formation of entrained air bubbles



When quality drops, turbidity meter yells for help . . .

Monitors filtration continuously

- Improves clarity of beer
- Increases filter capacity

Problem: Clarity of beer has been evaluated in the past by subjective, manual methods involving either straight visual estimation, or comparison with prepared turbidity standards.

Besides being subject to the whims of individual judgment, most of these checking procedures have been intermittent from necessity.

Thus, even if clarity checks are made every 15 minutes, 50 to 100 barrels of hazy beer could pass through a faulty filter pad before detection.

Solution: A pioneering West Coast brewery embarked on a development program over two years ago to apply continuous turbidity measurement to the final filtration process.

First studied were two nephelometers based on the Tyndall effect. But neither of these were readily adaptable to the particular needs of the brewery.

Next tried was an instrument for measuring clarity by direct transmission of light through the beer sample.

Check 3672 opposite last page

new...

THE
Dwyer

Filter Gage

tells exactly when to
change filters...
lasts indefinitely...
fits all furnace and air
conditioning units...

one hole, 60 second installation

Individually packaged with display/merchandising counter sales carton. A foolproof filter gage that really works, sold on a satisfaction or money-back guarantee. Write for free sample and discounts.

F. W. DWYER MFG. CO.

P. O. BOX 373-CP MICHIGAN CITY, INDIANA
Check 3673 opposite last page



INSTRUMENTS & LAB

First trials with the instrument disclosed that filtered beer having a slight objectionable haze would produce no signal at all.

By balancing circuits, choice of proper light filter, and choice of proper length of light transmission paths, this and other problems were solved.

How System Operates

Two separate clarity control operations are used — one for influent beer to the plate and frame filter; the other at the out-flow end.

In each case, suspended solids in the beer stream decrease the intensity of the light path through the sample flow cell.

Signal from the turbidimeter appears on a circular recording chart as percent transmittance, reading directly in standard Coleman Nephelo units.

Each turbidimeter is equipped with an alarm system which sounds a buzzer and flashes a red light as turbidity rises above a predetermined level.

When alarm sounds from the influent recorder, operator knows immediately that an increased filtration load is entering filter, and adjusts valve to add more filter aid.

If alarm sounds from the effluent recorder, operator also adjusts rate of filter aid flow.

If turbidity then continues to rise, he knows that he has a small break in the filter. The pumps are quickly stopped, and the faulty filter pad is removed before starting another filtration cycle.

Once a day, the brewer cleans the lines and flow cell by pumping detergent, followed by rinsing, through the by-pass system to the turbidimeters.

During this same period he standardizes each instrument on distilled water. This entire operation requires only about five minutes.

Results: Strict clarity standards can now be rigidly maintained through continuous clarity monitoring. Beer

READ

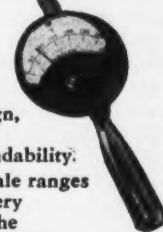
any surface temperature

with **Alnor** PYROCON

Equipment...material...metallic or non-metallic...flat, curved... revolving or stationary—you can read every surface temperature accurately in less than 3 seconds!

Compact, complete in precision design, this rugged instrument assures highest standards of speed, accuracy and dependability.

Alnor Portable Pyrocons come in scale ranges to 2000° F., with thermocouples for every application. You'll find full details on the Pyrocon exactly suited to your operations in Bulletin 4257. Send for your copy now. Write: Illinois Testing Laboratories, Inc., Room 504, 420 N. LaSalle St., Chicago 10, Ill.

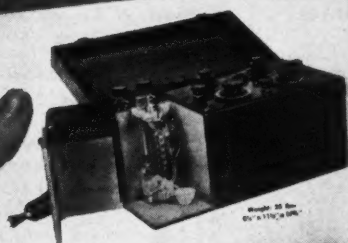


**PRECISION INSTRUMENTS
FOR EVERY INDUSTRY**

Check 3675 opposite last page

Send for **BULLETIN 911**

CAMBRIDGE
RESEARCH MODEL pH METER



CAMBRIDGE INSTRUMENT CO., INC.
3750 Grand Central Terminal, New York 17, N. Y.
PIONEER MANUFACTURERS OF PRECISION INSTRUMENTS

The Cambridge Research Model pH Meter measures pH and millivolt values where extreme precision and reliability are required. Although originally designed for biological and physiological use, the instrument is particularly useful in the Chemical, Pharmaceutical and Process Industries. The combination of features is not to be found in any other similar instrument.

CAMBRIDGE INSTRUMENT CO., INC.
3541 Grand Central Terminal, New York 17, N. Y.

PIONEER MANUFACTURERS OF PRECISION INSTRUMENTS

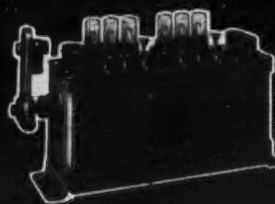
Check 3674 opposite last page

FEBRUARY 1959

accurate...
controlled...
timed lubrication...by

MANZEL

• Wide range of lubricators and controls, in single and multi-feed units. Experienced field engineers at your service to solve any problem.



HOUBAILLE **Manzel**

274 Babcock Street
Buffalo 10, N. Y.

Specialists in metering pumps and lubricators since 1898

Check 3676 opposite last page

not meeting these standards is *immediately* diverted for additional processing.

Furthermore, efficiency in the filtration room is vastly improved. Operators do not have to interrupt their own duties to judge clarity of the product—or call the lab to take samples in case of doubt.

Yet they know of any adverse changes in their operation *the instant the change occurs*.

By having objective, recorded, and continuous clarity information, plus rate of flow and total flow information, the best combination of filtration conditions can be chosen.

By utilizing the results from these efficiency studies, filter capacity can be increased.

For instance, the efficiency of different precoating practices can be compared, or various types and grades of filter aids can be evaluated under actual production conditions.

(Beckman flow turbidimeter is development of Beckman Instruments, Inc., Process Instruments Div., 2500 Fullerton Rd., Fullerton, Calif.)

Check 3677 opposite last page.

(Foxboro recording and alarm instruments are manufactured by The Foxboro Co., Foxboro, Massachusetts.)

Check 3678 opposite last page.

Fast valve positioner matches or exceeds controller speed

For both cylinder and diaphragm actuators

Uses: As valve positioner suitable for both cylinder and diaphragm-type actuators.

Features: Speedy valve positioner is capable of matching or exceeding speed and sensitivity of modern pneumatic controllers.

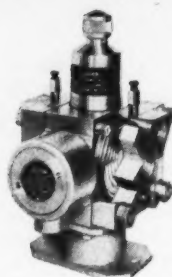
Description: Valve positioner combines force-balance design with pilot-relay valve to provide high power output and sensitivity. Feedback uses a tension spring, easily adjustable to obtain predetermined actuated travel for standard signal range. Stroke

Taylor Instrument Companies

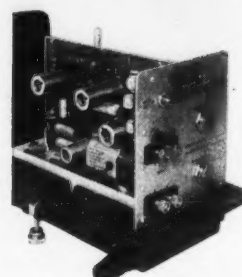
ELECTRONIC

with all the outstanding features of the

INSTANTANEOUS SENSING AND TRANSMITTING UNITS

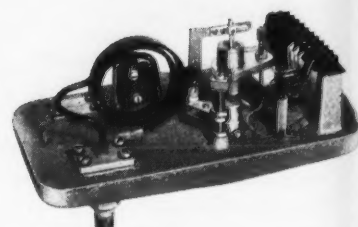


707T DP Transmitter. It provides direct conversion from differential pressure to an AC signal. No maintenance . . . insensitive to vibration . . . self-draining and venting . . . positive over-range protection to 1500 psi . . . no process fluid in contact with internal parts, double stainless diaphragm seal between process and electrical components . . . no stuffing box, no bending members, no pivots, no flexible diaphragms nor torque tube seals. No vacuum tubes, no transistors—only a simple differential transformer. Highly linear adjustable silicone damping. Perfect for all flow applications. External zero, with wide range of zero suppression. Designed for use in Class I, Group D, Division I areas.



700T Potentiometer Transmitter. Unsurpassed for sensing and transmitting Temperatures (either thermocouple or resistance elements), Load, Speed, pH, or other millivolt signals. Electronic balancing eliminates the need for slide wires, batteries, standard cells or moving parts. Continuous vernier adjustment of span or zero is simplest on the market.

Interchangeable plug-in service "cans" permit quick adaptation of one instrument for use with different primary elements. Amplifier plugs in for simple servicing. Infinite sensitivity to the input signal. Weatherproof case permits field mounting. Users consider it the finest potentiometer transmitter available.



705T Pressure Transmitter. Bourdon tube senses pressure changes and moves the core of a differential transformer to change its electrical output. A simple, extremely dependable unit, built for many years of trouble-free service. Simple span and zero adjustments. Pressure ranges from absolute to 2000 psi.

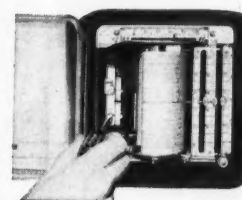
• • •

See your Taylor Field Engineer for full details or write for Bulletin.

Taylor Instrument Companies, Rochester, N. Y., and Toronto, Ontario.

VALVE POSITIONER

A true electro-pneumatic valve positioner, permits full utilization of the superior performance of electronic control, coupled with the power and smooth throttling action of pneumatic diaphragm motors. Pneumatic high-capacity, leakless booster relay is easily accessible for maintenance without exposing the electrical system. Unmatched stability due to powerful balanced armature reduces susceptibility to shock and vibration to a minimum. Designed for Class I, Group D, Division I areas.



is immediately visualized. Hence operators make fewer mistakes. All available in one 6" x 6" cutout.

1. Front Adjustments and all the features of the famous 90J Transcope Pneumatic Recorder. With chart, pen and set-point side-by-side (as in Transcope Pneumatic Recording Controllers) all pertinent process information

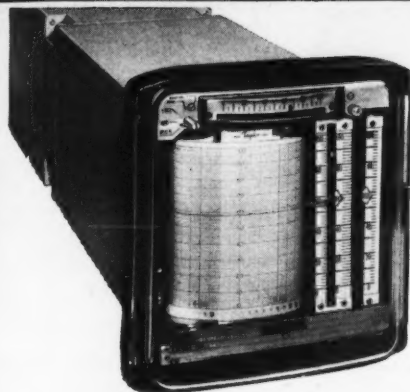
Taylor Instruments

ies sets new standards in

CINSTRUMENTS

of the highly successful TRANSCOPE* line!

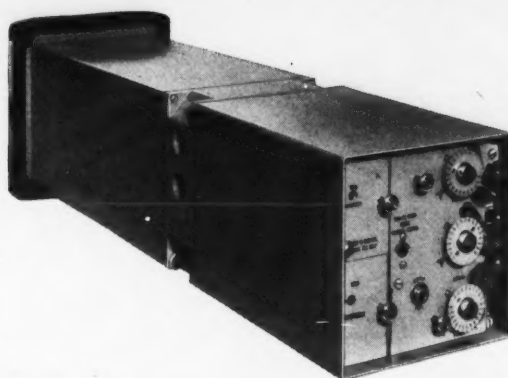
AC or DC RECORDER



Parallels electronically all the features of the TRANSCOPE Pneumatic Recorder that have won such wide acclaim. Positive, precise pen positioning provided by actual servo-motor, hundreds of times more powerful than meter type movement. Control settings and adjustments can be made from front or rear of case. Recorder can be removed without disturbing process control. Bumpless manual-to-automatic transfer is obtained without manual matching of set point and process. Plug-in Set Point Transmitter permits uninterrupted control.

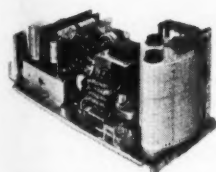
All transistorized (solid state), the 701J Recorder is unaffected by $\pm 10\%$ line voltage variation; thus there is no need for an expensive constant voltage source. All principal assemblies and sub-assemblies are plug-in type for flexibility and easy accessibility.

AC or DC CONTROLLER

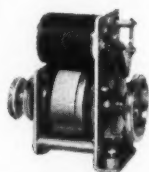


Embodies all the advantages of the most advanced control circuits. The unique diode limiter circuit permits even the two-response controllers to eliminate overpeaking on most applications. It is effective *at all times*, whether the variable is approaching control point from above or below; on changes in set point; following major process disturbances; or on start-up.

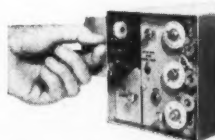
Interchangeable, plug-in assemblies permit conversion to either fast or standard reset and two-response or three-response controllers. Unparalleled rangeability makes this a universal controller. Unaffected by line voltage changes up to $\pm 10\%$. Controller signal gives multiple valve operation. Output signal from 1-5 Ma feeds into any load from 0-10,000 Ohms. Plug-in assemblies: control responses, operational amplifier, AC/DC Converter, DC reference supply and controller.



2. Interchangeable Recorder Slide. Completely transistorized. Unaffected by a supply voltage change up to $\pm 10\%$.



3. Powerful Servo Motor gives more precise pen positioning than ever before. More accurate records.



4. Plug-in Controller Sub-Assemblies. Printed circuit boards, mercury bottle disconnect switch.



5. Extremely Stable Controller Amplifier, utilizing latest design techniques and premium components.

*Reg. U.S. Pat. Off.

MEAN ACCURACY FIRST

Check 3679 opposite last page

INSTRUMENTS & LAB

linearity is said to be better than one percent. Completely enclosed and weatherproof, the unit responds to signal changes as low as 0.001 psi. Zero adjustment is readily accessible and can be made while in operation.

(Model J valve positioner is product of Conoflow Corp., 2100 Arch St., Philadelphia 3, Pennsylvania.)

Check 3680 opposite last page.



Accurate determinations

... in a minimum of time are possible with this melting point apparatus. Heating is rapid to within 5 or 10° of melting point. Further temperature increases can then be reduced to 1 or 2° per minute.

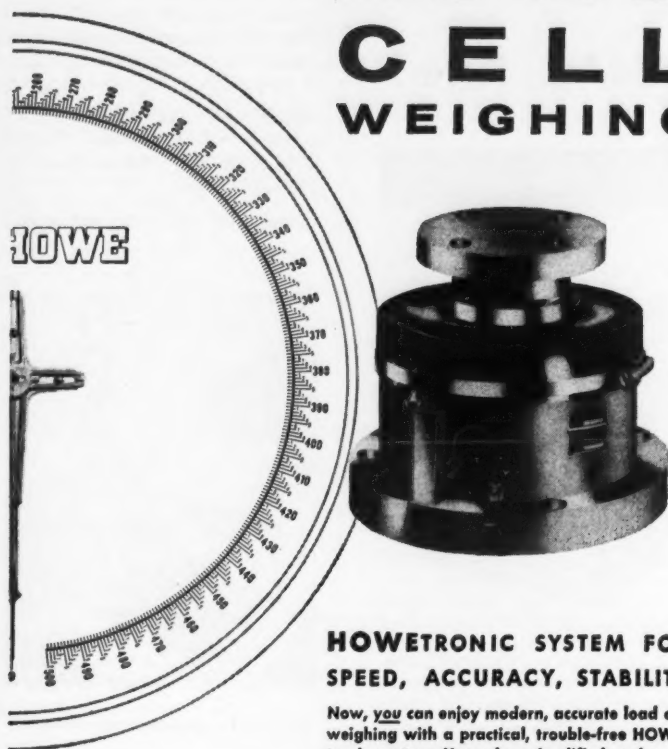
Apparatus is said to save considerable time between tests because small mass of heating fluid used plus its low specific gravity allows rapid cooling. Without compressed air, cooling takes 10 minutes from 300 to 100°C, and 8 minutes more to 60°C. With compressed air, the corresponding times are 4 minutes and 1½ minutes. Stirring of the fluid continues after heat and lights are switched off to help lower temperature rapidly for next test.

Magnifying lens in holder, easily adjusted to best position, permits convenient observation of measuring zone.

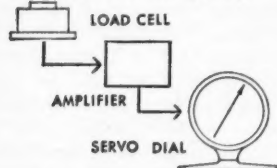
(Melting-point apparatus is available from Arthur S. LaPine and Co., 6001 South Knox Ave., Chicago 29, Ill.)

Check 3681 opposite last page.

simplified LOAD CELL WEIGHING



HOW IT WORKS



Pressure on the hydraulic load cell is transformed into an electrical signal directly proportional to load. This signal is fed into a simple, rugged servo system which positions a remote dial indicator, recorder or control. Accuracy is within established commercial tolerances; speed of response permits 2 to 4 second weighing with no hunting or overshoot. Only 1/2 second is required for check-weighing with control.

HOWETRONIC SYSTEM FOR SPEED, ACCURACY, STABILITY

Now, you can enjoy modern, accurate load cell weighing with a practical, trouble-free HOWETRONIC system. Howe has simplified and combined the best modern weighing elements into complete, rugged packages engineered for your application, no matter how difficult the operating conditions.

Howe's matched components guarantee all the advantages you should get from a load cell system: fast, accurate weighing with no hunting or overshoot; fewer adjustments; no waver, inertia, or time delay. Installation of factory-calibrated systems by factory-trained men is simple and rapid. Once installed, they stay within calibration and a minimum of maintenance is required.

From 1000 pounds to hundreds of tons, rugged HOWETRONIC load cell systems can guarantee speed and accuracy without resorting to critical mechanical or electrical designs. High cell output insures stable performance. HOWETRONIC load cells will accommodate substantial off-center or cross loading with no loss of accuracy.

Write today for complete information about this simple, practical approach to your difficult weighing problem.

HOWE

THE HOWE SCALE CO., RUTLAND, VERMONT
A SUBSIDIARY OF SAFETY INDUSTRIES, INC.

Check 3682 opposite last page

INSTRUMENTS & LAB

Construct organic forms with compressible PVC models

Molecular structures can be easily built up with complete kit of 100 atoms, claimed by manufacturer to be as flexible and compressible as actual atoms. No tools are needed for assembling. Each of 11 different atoms in kit is accurately scaled from very latest measurements of van der Waals' and covalent radii. Magnification is 165 million times actual size.

Pliability of models permits realistic demonstration of mobility of true molecules.

(Godfrey model kit is available from Will Corp., Box 1050, Rochester 3, N.Y.)

Check 3683 opposite last page.

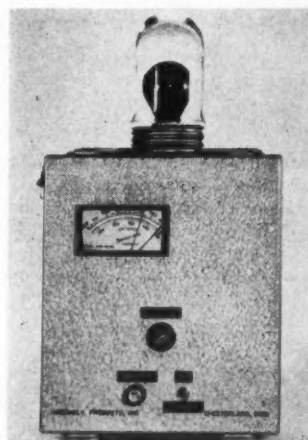
'Trouble-spot' monitor scans 24 stations every two minutes

Indicates abnormal conditions by light

Uses: Monitoring temperatures or almost any other measurable variable from as many as 24 stations.

Features: Monitors will scan 24 stations every two minutes. Abnormal condition is indicated by light.

Description: Originally developed for monitoring temperatures -200° to 3000°F, monitor checks stations in or-



Warning light on monitor indicates trouble

der, 12 per minute. Signals from thermocouples or other sources are indicated continuously by moving pointer of meter-relay. Alarm sounds if indicating pointer touches either a high or low limit point. Only restriction on use is that all stations have same permissible limits. These limits may be changed at will, however. Interlock keeps control circuit broken after an alarm until reset. Circuitry is "fail-safe."

(Sequence monitor is product of Assembly Products, Inc., Chesterland, Ohio.)

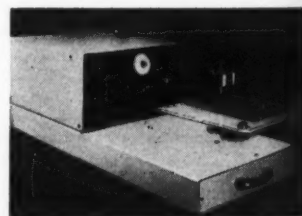
Check 3684 opposite last page.

Determines film data in form suitable for recording

Film tester rates factors in numerical values

Uses: Determining film properties as cohesion, adhesion, mar and abrasion resistance, impact resistance, scrub resistance, and cross-hatch brittleness test.

Features: Film tester rates factors in numerical values.



Film tester rates various film properties

Description: Film testing table is so constructed that run-of-the-mill laboratory panels, regardless of size or thickness, can be evaluated quickly. Tests are performed quickly by attachment of various specialized tools. These are attached to machine for each test. Results are said to be reproducible quickly and accurately.

(Wynn film tester is product of Forma Scientific, Inc., Box 543, Marietta, Ohio.)

Check 3685 opposite last page.

INSTRUMENTS & LAB

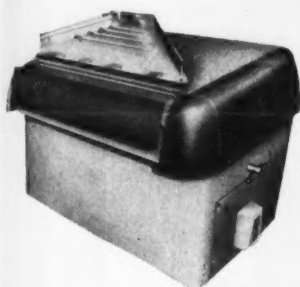
Lab flotation table adapts to research or production

Separates by fluidization

Uses: Laboratory or production classification of dry granular materials as minerals, chemicals, synthetics, foods.

Features: Air-flotation table adapts to laboratory research or production.

Description: Air-flotation table uses technique of dry



Laboratory flotation table separates dry materials

separation by fluidization. Classification is made by particle size, shape, or specific gravity. Unit permits recycling of middlings to obtain a high concentration of clean end-products.

Weighing 225 lbs, unit operates quickly on $\frac{3}{4}$ hp motor, 115 volts, and requires no foundation or bolting down. Overall size is $23\frac{1}{2}$ " x 34 " x 24 ".

(V-135 is product of Sutton, Steele & Steele, Inc., 1031 S. Haskell, Dallas 23, Texas.)

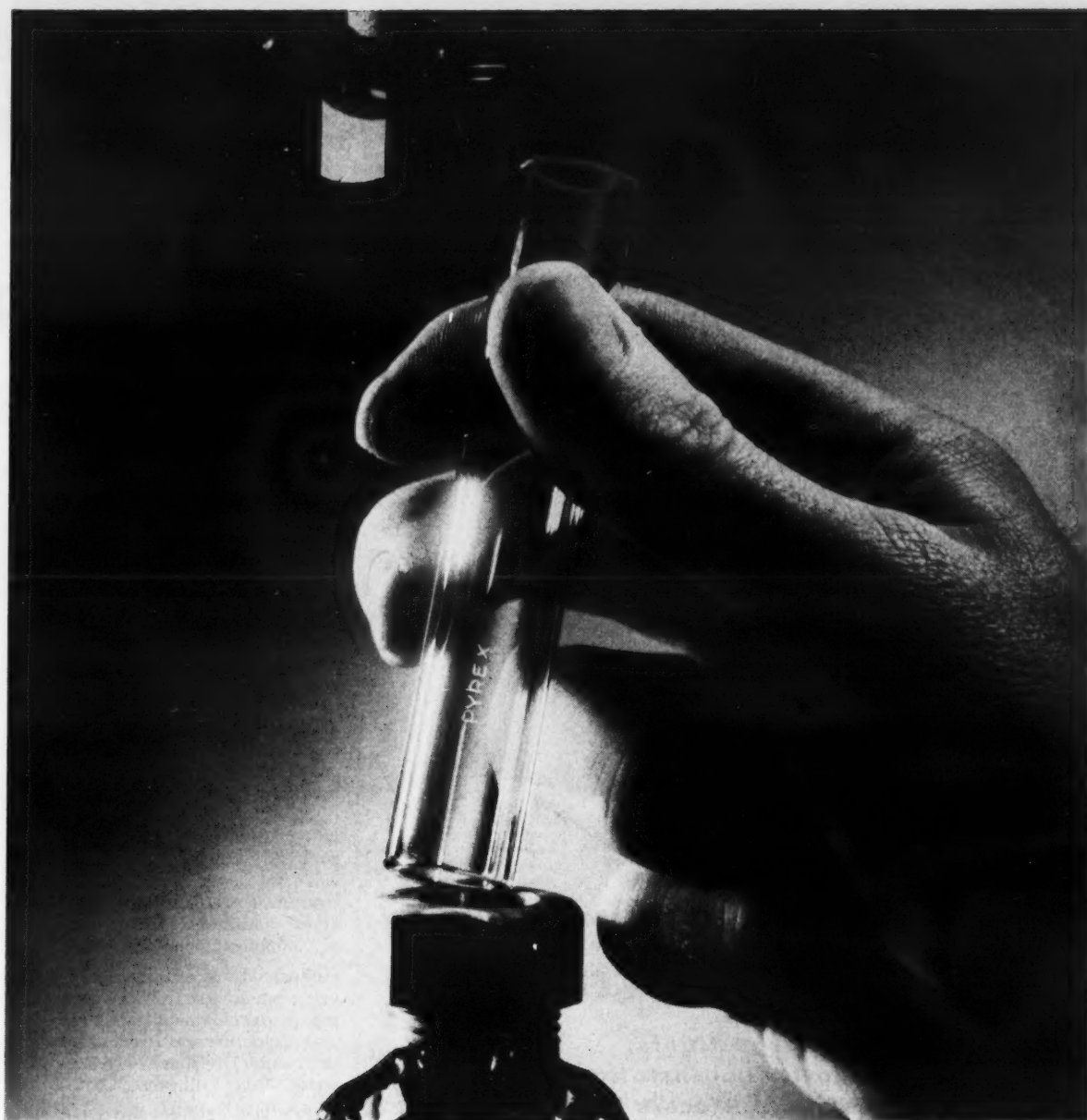
Check 3686 opposite last page.

Chromatograph read-out gives easy check of components

Line tracing given for each component at a glance

Uses: In pneumatic trend recording and controlling of process operations by cascade control through chromatography.

Features: Read-out system permits advantage of continuous easy checking of compo-



A gauge glass installed...and two more on the shelf

Make short work of gauge glass replacement—when the replacement is as near as your stockroom shelves. You'll cut down time.

Take *three* gauge glasses the next time you order from your distributor. That gives you *one* for the gauge right away, a *second* for regular replacement, a *third* to cover special emergencies.

And here's another tip—don't rely on any old type gauge glass. Insist on regular replacement with PYREX®, CORNING®, or MACBETH® to avoid trouble.

These gauge glasses last longer—because they're harder to break! They stand up better to just about every clouding hazard. They easily resist high temperatures and high pressures.

One of these brands is just right for your gauge. Get some from your regular mill supply dealer. And remember—ask for *three* for each gauge!

(Corning makes sight glasses, too—from tough PYREX brand glass. Use them whenever you must see what's going on inside your processing equipment. Your distributor has them.)

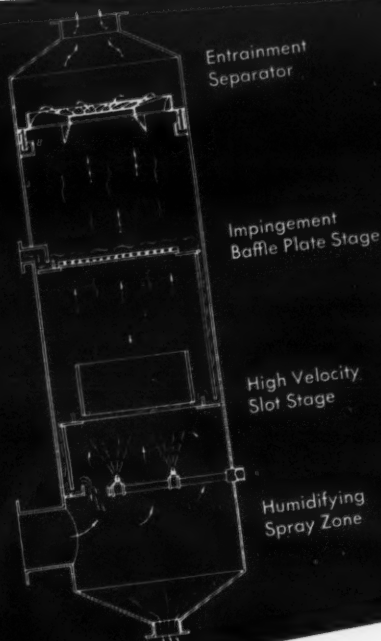
Corning means research in Glass



CORNING GLASS WORKS, Corning, N. Y.

Check 3687 opposite last page

BLUEPRINT FOR MORE EFFICIENT FUME REMOVAL



...THE PEABODY HIGH VELOCITY GAS SCRUBBER

**In Nuclear Energy Plants,
Exotic Fuel Installations,
Conventional Process Plants...**

This scrubber assures maximum removal of sub-micron particles for any given pressure drop. At gas capacities from 100 to 200,000 SCFM, and with inlet dust loadings up to 100 grains per cubic foot, it provides the highest collection efficiency with minimum power consumption.

In recovering fume of sodium oxide, radioactive wastes, boric oxide, asphalt, ammonium chloride, salt cake, blast furnace gas and other materials, this unit agglomerates and collects sub-micron particles while simultaneously cooling the gas and absorbing soluble vapors such as iodine. A Peabody High Velocity Gas Scrubber in an atomic energy installation, removes 98 to 99% of sodium oxide fume.

Whether your process is rare or routine, Peabody's world and industry-wide experience will provide an efficient and economical solution to your gas and liquid contact problems. We invite your inquiries.

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232 MADISON AVENUE, NEW YORK 16, N.Y.

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8-385

Check 3688 opposite last page

INSTRUMENTS & LAB

nents of interest. Continuous line trace of each component of interest gives at-a-glance information on concentration trends in process. Single curve for each component allows measurement of a critical component to be used as a control point.

Description: Analysis by standard chromatograph results in electrical signal output for each component of interest. Signal is transformed by transducer to pneumatic signal proportional to quantity of component. When signal into transducer reaches a maximum, transducer freezes at maxima. Simultaneously, timing device programs opening and closing of valves to pneumatic receiver and memory units.

Timer also programs restoration of transducer system to operation from frozen position after peak value is properly stored.

Pneumatic signal for each component is transmitted from pneumatic memory system to recorder, giving quantitative trace of signal peak. Memory unit maintains pressure so signal to recorder continues when electrical signal to transducer returns to 0. This gives continuous trend trace of component concentration.

(Industrial gas chromatograph using pneumatic trend recording is development of Beckman/Scientific and Process Instruments Division, 2500 Fullerton Rd., Fullerton, Calif.)

Check 3689 opposite last page.

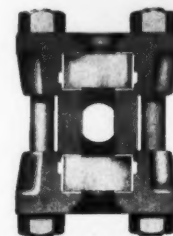


"Don't worry about two
— I had Limburger
cheese sandwiches."

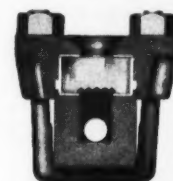
Strahman

HIGH PRESSURE GAUGES

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AND
CHEMICAL PLANTS
THROUGHOUT
THE WORLD**



THRU VISION



REFLEX

**Single or Multiple
Sections**

TUBULAR

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Heated or Cooled
Gauges**

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COMPLETE
CATALOGUE**

STRAHMAN VALVES, Inc.
16 Hudson St., New York 13, U.S.A.

Check 3690 opposite last page
CHEMICAL PROCESSING



UV Analyzer prevents loss of 44 bbl of furfural/month

Same instrument saves a somewhat lesser amount
of furfural on another stream — four other
UV units cut butadiene losses

GORDON WEYERMULLER, Petrochemical Editor
with DONALD WREYFORD, Research Physicist
Texas Butadiene & Chemical Corporation, Channelview, Texas

Of five ultraviolet analyzers in use at Texas Butadiene & Chemical Corporation, most unusual application is the one unit that is used for monitoring furfural strippers. Procedure which enabled UV analyzer to be used for this purpose was developed at Texas Butadiene. It is believed to be the first time that a UV instrument has been used for monitoring furfural.

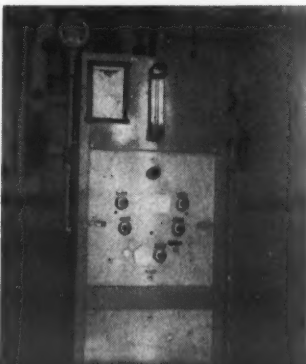
Since UV analyzer was placed in service, average monthly loss of furfural has decreased 44 bbl per month from one stream. In addition, this results in a saving of sulfuric acid at the rate of 170 tons per month. Hence, the use of this analyzer on one stream accrues a total saving of about \$5000 per month. A somewhat lesser amount is saved by use of same UV analyzer alternately on a second stream.

On one of the two furfural

strippers, butylenes are taken overhead while on the other stripper, butadiene is taken overhead. In both cases furfural flows from the bottom of stripper. Furfural carried over with the butadiene is lost but does not consume chemicals. Furfural carried over with the butylene enters the alkylation plant and consumes sulfuric acid.

The UV analyzer monitors the furfural from 0 to 7500 ppm. Furfural going overhead normally runs 5-10 ppm. If it increases above this figure, operating conditions are changed. UV analyzer used

CP Staff Photos



Typical installation of UV analyzers
at Texas Butadiene

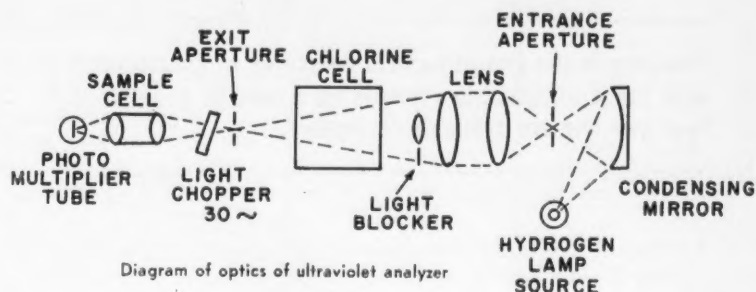


Diagram of optics of ultraviolet analyzer

for this application paid for itself the first two months it was used.

completely lost. It normally runs 2%. This is a small volume stream.

Butylene Splitters

Two of the other four analyzers at plant are used on two butylene splitters to minimize butadiene losses. Butadiene is analyzed in streams containing butene 1, normal butane, butene 2, and a trace of C_5 s. Only 0.2% max butadiene is permitted to come off bottom of columns.

Both analyzers are being used as recorder-controllers. A change in butadiene concentration at sample point causes a reset of flow controllers on steam to reboilers. Hence, units both monitor and control. Accuracy is within $\pm 0.05\%$ butadiene.

Deoiler, Depropanizer

Another UV analyzer alternately monitors the deoiler and depropanizer at five-minute intervals. Deoiler separates C_4 , C_5 , and heavier fractions. UV monitors butadiene that goes overhead in the deoiler so that operating conditions on the butylene splitters can be corrected if the butadiene content in this stream exceeds 0.3%.

Depropanizer is used to strip C_3 and lighter fractions from C_4 . UV analyzer monitors butadiene in overhead. Any butadiene lost here is

Furfural Absorber

Remaining UV analyzer monitors the overhead of furfural absorber for butadiene. It runs from 0 to 3.0%. If figure goes over 0.5%, overhead is recycled so that more butadiene is absorbed in furfural. UV unit tells plant when to do this.

UV Analyzers

UV analyzers used are optically double-beam instruments. Physically, there is only one light path, as shown in diagram. An optical chopper intercepts the light beam at 30 cps. During one-half cycle, chopper will transmit radiation of 200 to 280 mu to photomultiplier detector. In other half of cycle, chopper transmits radiation of 230 to 280 mu.

Latter half cycle acts as a reference beam. An increase in butadiene concentration will cause a decrease in unbalance between the two half cycles. Change in unbalance is calibrated as percent butadiene.

(UV analyzers are product of Consolidated Electrodynamics Corporation, 300 North Sierra Madre Villa, Pasadena, Calif.)

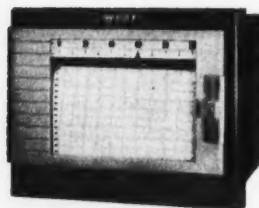
Check 3691 opposite last page

Proved Procedure to cut costs by better Temperature control

Following is the gist of reports on scores of operations in a wide range of industries. Details on a specific application in your own line are available on request.

1. Chances are that temperature is a factor in at least one step of your operation. Effect of its control may range far beyond that one step.
2. Comparing virtually identical operations in different plants shows that degree of control varies widely. Even where control is considered "no problem," improvements invariably reduced costs in one or more steps.
3. Costs of operating the control equipment itself varies widely. Tubeless instruments, for example, avoid maintenance cost of adjustment and replacement of tubes and allied circuitry.
4. Greatest economies result from increasing quantity while maintaining quality of production. This is achieved by avoiding downtime or even delay due to control instruments or imperfect temperature of the material in process.
5. Best way to find out how much *you* can cut control costs is to call in a specialist who is familiar with most applications and free to propose just the right indicator, controller, recorder, etc. For free consultation many operators rely on world-wide service by West.

Marksman Recorders



Model M (shown) potentiometer strip-chart recorder delivers outstanding service and economy through features rarely available in a single instrument. Veri-Tell indicators and Gardsman controllers serve as well. All are tubeless, "solid-state" and proved in wide use. Phone your West consultant (see Yellow pages) or write Chicago office for Bulletin M or for COM digest-catalog of line.



the trend is to WEST



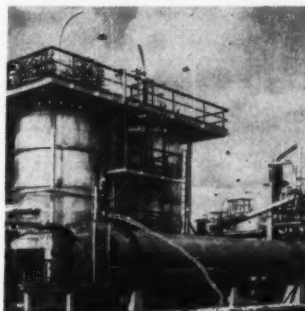
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PETROCHEMICALS

**All-welded construction
of aluminum dryers
cuts equipment cost**

Using all-welded aluminum construction for two steam tube dryers at the 50 million-lb high density low pressure polyethylene plant of W. R. Grace & Co.'s Polymer Chemicals Division, Baton Rouge, La., has effected significant savings in equipment costs. Dryers have operated with a minimum of maintenance since placed in service about a year ago.

Except for tires, driving



One of aluminum dryers which helps to maintain high quality of polyethylene resin at W. R. Grace & Co. plant

gears, trunnion roll assemblies, and bed frame, aluminum was used throughout. Stainless steel pads separate dissimilar metals to prevent electrolytic erosion.

All-welded construction of shell, hoods, steam tube system, and manifolding was designed to provide greater strength and longer equipment life. Allowance was made for expansion of unit under heat due to higher coefficient of expansion of aluminum.

A tight seal is maintained inside dryers through use of double seals for all connections between shell and hoods. Floating-type rotary joint fabricated of stainless steel and aluminum parts supplies steam to dryers. Joint was designed specifically for this application.

The nature of polymer resins being handled in dryers is such that processing must be done in oxygen-free atmosphere. Aluminum was chosen for equipment because it will

Some Reasons Why **DURA MECHANICAL SEAL** is the Best to Buy



is backed by 25 years of experience in the mechanical sealing field.



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meets the widest range of pressures, temperatures and liquids.



is easy to install—application can be made on your present equipment.



parts are interchangeable, providing economical operation on multiple applications.



is repairable—replacement of worn parts restores service and protects your investment.



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DURAMETALLIC CORPORATION
KALAMAZOO, MICHIGAN

Check 3693 opposite last page
CHEMICAL PROCESSING

not contaminate product.

(Steam tube dryers — including design of shell, hoods, steam tube system, and manifold — were manufactured by Standard Steel Corporation, 5025 S. Boyle Ave., Los Angeles 58, Calif.)

Check 3694 opposite last page.

(Special aluminum tubes were extruded by Kaiser Aluminum & Chemical Corporation, Kaiser Building, 1924 Broadway, Oakland 12, Calif.)

Check 3695 opposite last page.

Dehydrogenation unit for synthetic rubber in West Germany

The first of three U. S. licensed foreign dehydrogenation plants has gone on stream at the Chemische Werke Huels, A.G. in Marl, West Germany. The unit is designed to produce 36,000 metric tons per year of butadiene.

The dehydrogenation process produces butadiene, the principal ingredient in general-purpose synthetic rubber, from refinery butanes and butane-butene mixtures from petroleum refineries. The process may be operated to produce butadiene for synthetic rubber, fiber, paint and textiles; butenes for alkylation to very high octane motor fuel; or adapted to produce olefins from corresponding light hydrocarbon feedstocks.

Other, similar units, are under construction in Japan and Italy. Seven dehydrogenation units of this type are on stream in the United States.

(Dehydrogenation process unit was designed by Houdry Process Corporation, 1528 Walnut St., Philadelphia 2, Pa.)

Check 3696 opposite last page.

Ball valves that are non-lubricated are described in detail in 16-page bulletin. Two pages of information are given on products that have been successfully handled by valves. Temperature and pressure conditions are included. "Ball Valves" — W-K-M. Div., ACF Industries, Inc., PO Box 2117, Houston, Texas.

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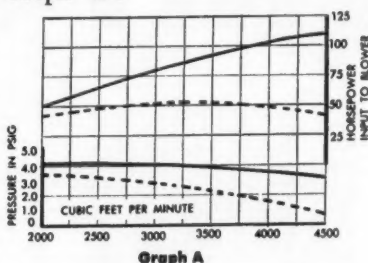
The Use Of Air Offers Great Prospects For Increasing Industry's Productive Capacity

— Thomas Alva Edison

Today, when much is being written on the necessity of reducing overhead, it is significant that custom engineered air equipment is leading the way to increased plant efficiency and lower operating costs. For example, in delivering clean, dry air or gas continuously at constant pressure, Hoffman Multistage Centrifugal Blowers and Exhausters and Hoffman Positive Displacement Cycloblowers are at work handling a wide variety of products. These range from the crating of fragile eggs to the rugged service demands of Pneumatic Conveying.

Efficiency and Adaptability

Hoffman Centrifugal Blowers and Exhausters furnish pressures up to ten pounds per square inch or vacuums up to 12 inches of mercury with volumes to 20,000 cfm. By varying the number of stages and utilizing different types of impellers, various ratings and operating characteristics can be obtained. Centrifugal Units are furnished with radial or backward curved impellers or combinations of these types to satisfy individual process requirements. The performance characteristics of these impellers are illustrated in Graph "A".



Graph A

The radial impeller has a relatively flat pressure characteristic throughout its volume range. A backward curved impeller differs from the radial impeller in that it falls off in pressure as volume increases. The graph shows that the horsepower requirement of the backward curved impeller reaches a maximum and then falls off to provide a non-overloading characteristic. Economy of operation is assured since power is consumed only

in proportion to the actual air or gas volume handled. The absence of any internal wearing surfaces and the lubrication of bearings in out-board mounted housings makes it impossible to contaminate the air or gas handled.

Send for Bulletin AB-104.

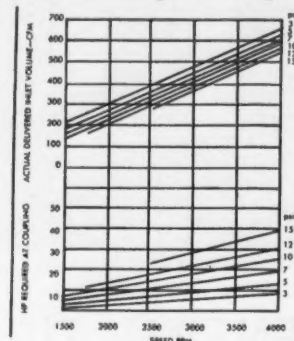
Cycloblower Meets Tough Service Demands



Designed for similar tough service demands, the Hoffman Cycloblower is a compact axial flow, Positive Displacement Blower/Exhauster incorporating perfectly symmetrical rotor forms. Interruption of the continuity of rotor seals without sacrifice of the advantages of such forms allows increased water rates for wet compression and vacuum service. Shock, temperature and loading due to build up of pressure is effectively eliminated. The Cycloblower has a normal operating range up to 15 lbs. per square inch and 15 inches of mercury with dry compression. With water injection, vacuums of 22 inches of mercury and pressures of 30 lbs. per square inch can be obtained. Volume capacities range from 80 cfm to 3500 cfm.

A Positive Displacement Unit is a constant volume machine, whereas a Centrifugal is a variable volume machine. In Graph "B" it will be noted that at a constant RPM, the

Positive Displacement Blower/Exhauster can deliver pressures from 3 to 15 lbs. If a unit is selected to operate at 500 cfm and 3 psig, it will have to operate at approximately 3050 RPM and require 8 HP. Should changes in the process



Graph B

require more pressure, the Positive Displacement Unit will automatically build up to the required pressure while still maintaining constant volume. It will, of course, require the additional horsepower as indicated in the graph. A pre-set relief valve acts as a built-in safety device. It limits the amount of pressure which can be built up when the requirements of the system exceed the capabilities of the equipment. Lubrication within the compression chamber is unnecessary since the rotors do not touch. The possibility of oil contamination is thus avoided in the same manner as it is in the Hoffman Centrifugal Units.

Send for Bulletin CB-157.

Wide Performance Range

Centrifugal and Positive Displacement Units have an overlapping range of performances. Without cost or obligation Hoffman engineers will recommend the most efficient units for your particular requirement. Whatever your problem, feel free to call on Hoffman's quarter of a century of engineering experience and background to meet your special needs. Send now for these free helpful booklets.

Kindly send the following FREE booklets.

U.S. HOFFMAN MACHINERY CORPORATION

Dept. C-1
Air Appliance Division
103 Fourth Avenue
New York 3, N. Y.

- ☐ AB-104 — How Multistage Centrifugal Blowers & Exhausters save on production costs.
☐ CB-157 — How Cycloblowers can help increase production.

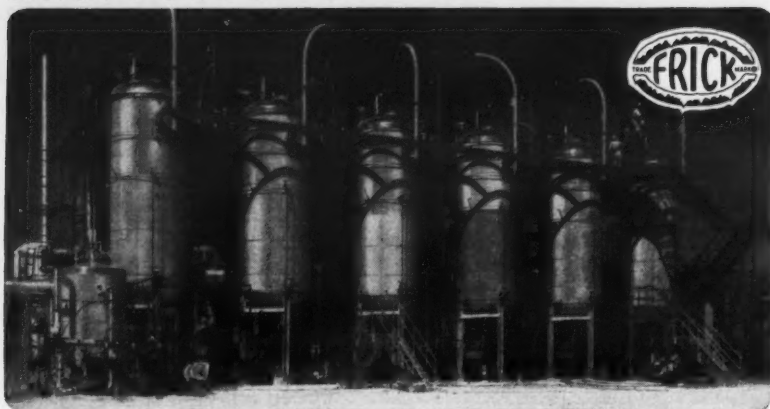
NAME.....TITLE.....

COMPANY.....

ADDRESS.....

Check 3698 opposite last page

NEW.....



Rubber Reactors at Odessa, Texas

GENERAL TIRE & RUBBER CO. SYNTHETIC RUBBER PLANT

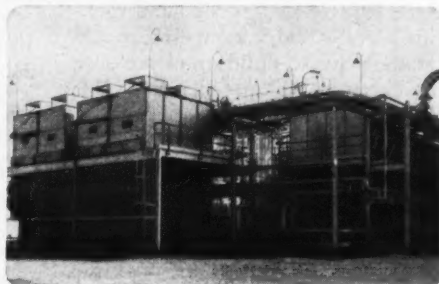
Frick Company furnished the twelve big reactors* illustrated, each 22 ft. high and equipped with a double set of Frick cooling coils*; plus coolers and evaporative condensers for butadiene, evaporative condensers for ammonia, and numerous auxiliaries.

By a new improved process* synthetic rubber, formerly made in batches, is made in this plant by continuous process. The shells are divided into upper and lower sections by a central partition, each containing a separate set of cooling coils. The coils are fed with direct-expansion ammonia, under float valve control, and each shell has a total cooling load of 110 tons of refrigeration.

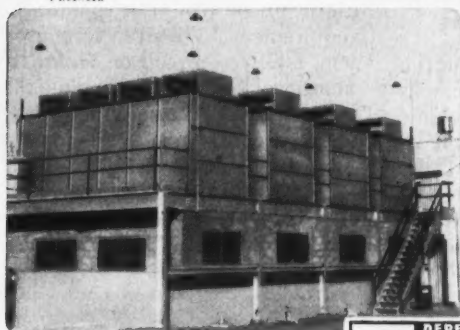
Thus another great synthetic plant joins the list of firms using Frick cooling equipment.

Whatever the refrigerating requirements of YOUR plant — air conditioning, process cooling or condensing, cold water, ice making, quick freezing, cold storage, or low temperatures—Frick engineers will help you design a system to meet your needs.

* Patented



Five special Frick evaporative condensers for butadiene in service at Odessa, Texas.



Frick evaporative ammonia condensers with superheaters at General Tire & Rubber Co.

FRICK CO.
DEPENDABLE REFRIGERATION SINCE 1882
WAYNESBORO, PENNA., U. S. A.

Call
your nearest Frick Branch,
Distributor or write to...

Check 3699 opposite last page

PETROCHEMICALS

**Lightweight honeycomb
of thin-walled ceramics
resists 1000°C temp**

Operates at 700°C, hardly
any thermal expansion

Uses: In gaseous heat exchangers, as catalyst supports, and as structural materials for use at elevated temperatures.

Features: Materials can withstand temperatures up to 1800°F with virtually no thermal expansion, and can operate continuously at 1290°F. At these temperatures, the materials are resistant to oxidation and corrosion.

Materials have extremely low coefficient of thermal expansion — 1×10^{-7} per degree C (from 0 to 300°C). They can withstand extreme thermal shock.

Description: Extremely thin-walled ceramics are formed into lightweight honeycomb structures. Discs 20 inches in diameter and $3\frac{3}{4}$ inches thick

have been made by this process. Protective rim for disc is formed by tough coating of special material with matching expansion and equally high

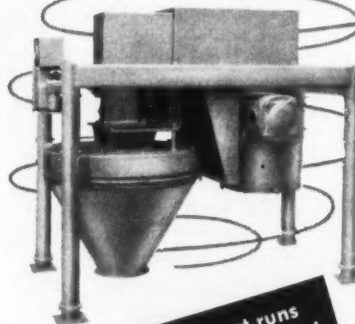


Lightweight honeycomb structures, formed of thin-walled ceramics, can be used where lightness, thermal shock resistance, and high-temperature strength are requisites

resistance to temperatures. This rim can be applied to all sizes to protect thin-edged walls against excessive outside stresses. It can also be used as a mounting support.

MIX BETTER BY

IMPACT



Finer and more intimate dispersion of solids can be achieved using an Entoleter® centrifugal impact mill.

- Low cost — low power requirements
- Minimum (controlled) temperature rise

RECENT APPLICATION

For the final dispersion of detergent, bleach, perfume and highly abrasive silica flour in a popular powdered household detergent, this 27" model with abrasion resistant impactors does the job.

**Free test runs
on your material.**

Send for literature on Impact Milling, Particle Size Reduction and the new line of Vibrating Screens.



ENTOLETER
DIVISION OF SAFETY INDUSTRIES, INC.

P. O. Box 904, New Haven, Conn.

Check 3700 opposite last page

CHEMICAL PROCESSING

PETROCHEMICALS

Pieces of this material have a compressive strength, parallel to the channels, of 2000 psi. Surface area of 20-hole-per-inch corrugated structure is 1500 square feet per cubic foot of material. Of total face area, 75 to 80 percent is open space. Hole sizes are approximately 0.095 inch long and 0.045 inch high. It is believed that the cellular holes can be formed into a variety of shapes with wide range of dimensions.

Material has density of about 30 pounds per cubic foot and specific heat (room temperature) of 0.20.

(Cercor structures are development of Corning Glass Works, Corning, N.Y.)

Check 3701 opposite last page.

Oxygen analyzer with new automatic calibrator is explained in four-page Bul 0704-1 — Mine Safety Appliances Co., 201 N. Braddock Ave., Pittsburgh 8, Pa.

Check 3702 opposite last page.

Compressor features low maintenance, oil-free air

High-output rotary-screw unit requires little floor space

On the basis of operating experience during a two-year series of exhaustive field tests, manufacturer has gone into full production of space-saving, positive-displacement, rotary-screw air compressors delivering up to 19,250 cfm.

In a special 17-month trial period, two rotary-screw compressors were satisfactorily operated a combined total of 9900 hours, 8900 at full load. They were operated at delivery pressures of between 105 and 115 psi.

In addition to design compactness, compressor offers substantial maintenance savings because rotaries do not quite contact each other during high-speed spiral-like operation. Beside reducing com-



Transfer Many Thermocouples

With T-E Quick-Coupling Connectors and Panels

Connector Panels T-E has one for your exact needs. These panels provide flexible, centralized control in transferring any number of thermocouples to indicating, multi-point recording and controlling pyrometers. Ideal for patch panel use, they are available in many compact shapes and sizes — with interchangeable plugs and jacks in I-C, C-C, and C-A. A panel for 48 thermocouples and 16 pyrometers measures only 13 1/4" x 7 1/4". Polarity markings and screw-fastened connections make wiring easy.

Quick-Coupling Connectors These connectors permit fast, easy making and breaking of thermocouple circuits. Durable construction guarantees long, dependable usage. Polarized and mechanically interchangeable, all plugs and jacks are of standard matched thermocouple materials. Spring-loaded contacts with long wiping surfaces provide firm but easily broken connections.

Write for Bulletin 23 — R

Thermo Electric Co. Inc.
SADDLE BROOK, NEW JERSEY
In Canada — THERMO ELECTRIC (Canada) Ltd., Brampton, Ont.

Check 3703 opposite last page



R/M Teflon flexible expansion joints look like the answer to that corrosion problem.
Call Bob

Chemical-handling accessories, made of "Teflon"® by Raybestos-Manhattan, are the answer to many of your more difficult problems.

"Teflon" shows no reaction to chemicals—except for fluorine gas and chlorine trifluoride, both at high temperatures, and molten alkali metals. Impervious to all known industrial acids and caustics. Can be kept in continuous service in a wide temperature range.

Another valuable plus for you: R/M's strict quality control and pre-

cision workmanship. You can depend on R/M "Teflon" products: solid and envelope gaskets, sheets, rods, tube, tape, expansion joints, flexible couplings, stuffing box and valve stem packings, Vee-Flex packings, solid and braided packings.

R/M's engineers have amassed a wealth of experience in manufacturing packings and gasket materials to meet the most exacting requirements of the chemical industry. This experience is at your disposal any time—write R/M Packing Division.

R/M MAKES A COMPLETE LINE OF MECHANICAL PACKINGS—including Vee-Flex,® Vee-Square,® Universal Plastic and "versi-pak"®; GASKET MATERIALS; "TEFLON" PRODUCTS. SEE YOUR R/M DISTRIBUTOR.

*A Du Pont trademark



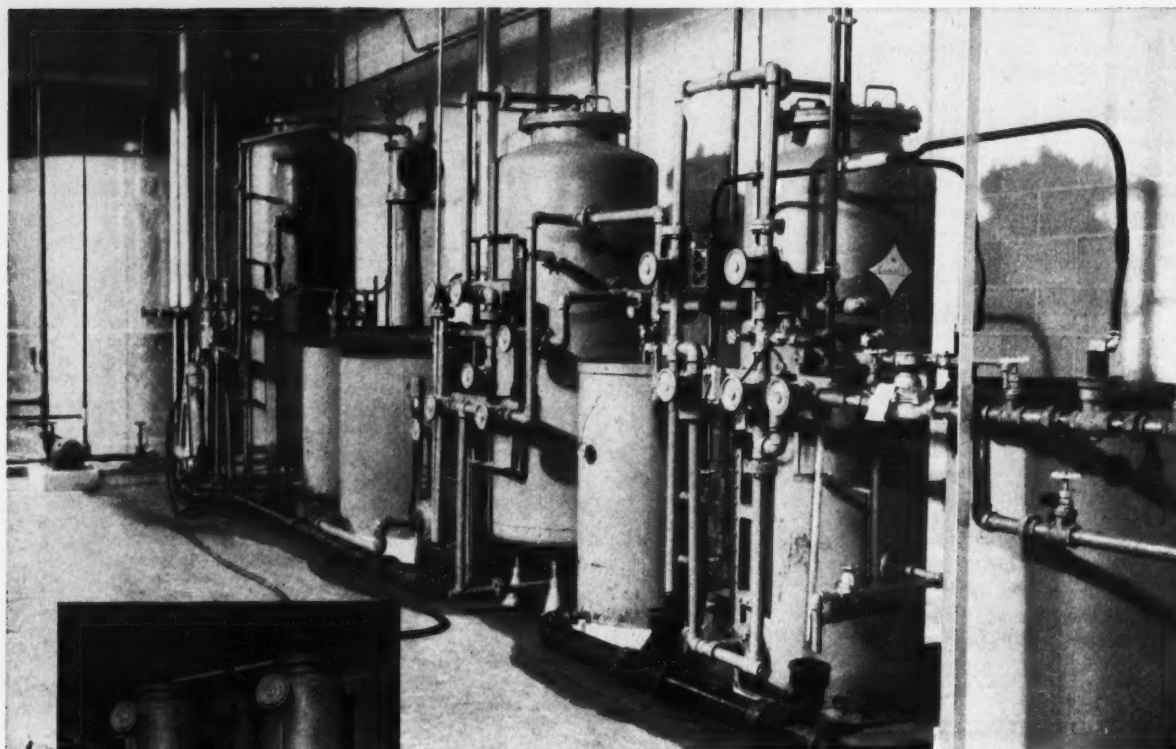
R/M PACKINGS
RAYBESTOS-MANHATTAN, INC.
PACKING DIVISION, PASSAIC, N.J.
MECHANICAL PACKINGS AND GASKET MATERIALS

RAYBESTOS-MANHATTAN, INC., Mechanical Packings • Asbestos Textiles • Industrial Rubber • Engineered Plastics
Sintered Metal Products • Abrasive and Diamond Wheels • Rubber Covered Equipment • Brake Linings
Brake Blocks • Clutch Facings • Industrial Adhesives • Bowling Balls • Laundry Pads and Covers

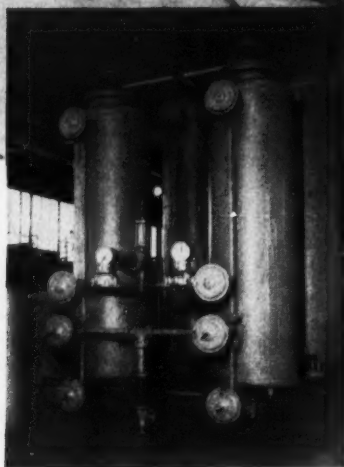
Check 3704 opposite last page

INDUSTRIAL ION EXCHANGE TECHNIQUES

... low cost solution to specialized purification problems



EXAMPLE 1: Purification of Formaldehyde. Specialized anion exchange technique removes formic acid from formaldehyde. This Industrial semi-automatic, dual unit also "up-grades" water white formaldehyde for resin manufacture—yields final resins with resistance to off-color blush or bloom.



EXAMPLE 2: Chemical preparation. An Industrial mixed-bed ion exchange unit used for removal of sodium formate and formic acid from an organic polyhydric alcohol intermediate. Process facilitates subsequent purification by evaporation.

• Are you concerned with the removal of mineral impurities from solvent solutions—chemical intermediates—purification of glycerine—or other materials which usually require tedious, costly processing by alternate methods? If you are faced with the problem of purifying such materials, and if they contain even traces of moisture, then *Industrial*-engineered ion exchange techniques and equipment may provide a complete and inexpensive answer to your problem.

The two installations of *Industrial* ion exchange equipment illustrated here are typical of the many specialized applications of ion exchange developed and engineered by *Industrial* to meet specific chemical process industry requirements.

To evaluate the possibilities of these techniques to solve your purification problems, and to obtain an analytical study, consult *Industrial*, soon.



For general information covering *Industrial* Ion Exchange equipment, write for a copy of BULLETIN 200.

INDUSTRIAL

INDUSTRIAL FILTER & PUMP MFG. CO.
5908 Ogden Avenue, Chicago 50, Illinois

C-158

PRESSURE FILTERS ♦ ION & HEAT EXCHANGERS ♦ WASTE-TREATING EQUIPMENT

Check 3705 opposite last page

PETROCHEMICALS

ponent wear, this design assures a flow of completely oil-free air or gas.

In operation, compressor draws air into front end of its twin-screw assembly. As large threads or lobes of parallel-mounted screws rotate into each others grooves at high speed, air is spiraled ahead into increasingly small interlobe volumes, until it is forced through discharge port at pressures ranging up to 120 psi. Twin-rotary two-stage compressor develops four complete compression cycles per revolution and operates at speeds of 3600 rpm.

According to manufacturer, compressors will be available to U.S. industry in 6700, 10,000, and 19,250 cfm models.

(Rotary-screw air compressor is product of Atlas Copco, 610 Industrial Ave., Paramus, N.J.)

Check 3706 opposite last page.

Nitric acid plants—their design and construction — are described in four-page brochure which includes flow diagram of typical application of Du Pont high-pressure ammonia oxidation process. "Nitric Acid" — Girdler Construction Div., Chemetron Corporation, Louisville 1, Ky.

Check 3707 opposite last page.

Rotary positive blowers are detailed and pictured in eight-page bulletin. Gas pumps and vacuum pumps are also covered. Bul S-59G — Sutorbilt Corp., Subs. of Fuller Co., Compton, Calif.

Check 3708 opposite last page.

Single unit protects gages, personnel

Instant shutoff for actuation from 5-2400 psi

Uses: For protecting gages from over-pressure.

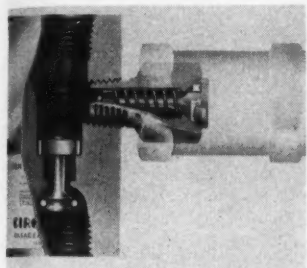
Features: System provides, in a single unit, all characteristics necessary for protection of gages and operating personnel. Precise operation is insured even at very low settings due to use of contact rather than sliding seals.

Description: Gage protector has instant, precise shutoff for

PETROCHEMICALS

actuation from 5-2400 psi. Gage protector valves overcome O-ring breakaway friction problem, characteristic of piston-type units.

Protectors automatically shut off instantly to protect operating personnel in event



Contact seals of gage protector valves insure precise operation even at very low settings

of bourdon tube rupture. Automatic gage cut-out and cut-in is provided. Snubbing action in gas systems where surge waves or shock waves are encountered closes valve unit momentarily to reduce shock on gage elements.

Protection system permits cascading gage to provide accurate pressure readings over wide range of pressures. Protector valves automatically cut out lower pressure gages as system pressure rises and cut them in as system pressure falls.

(The 1100 Series Gauge Protector valves are product of Circle Seal Products Company, Inc., 2181 East Foothill Blvd., Pasadena, Calif.)

Check 3709 opposite last page.

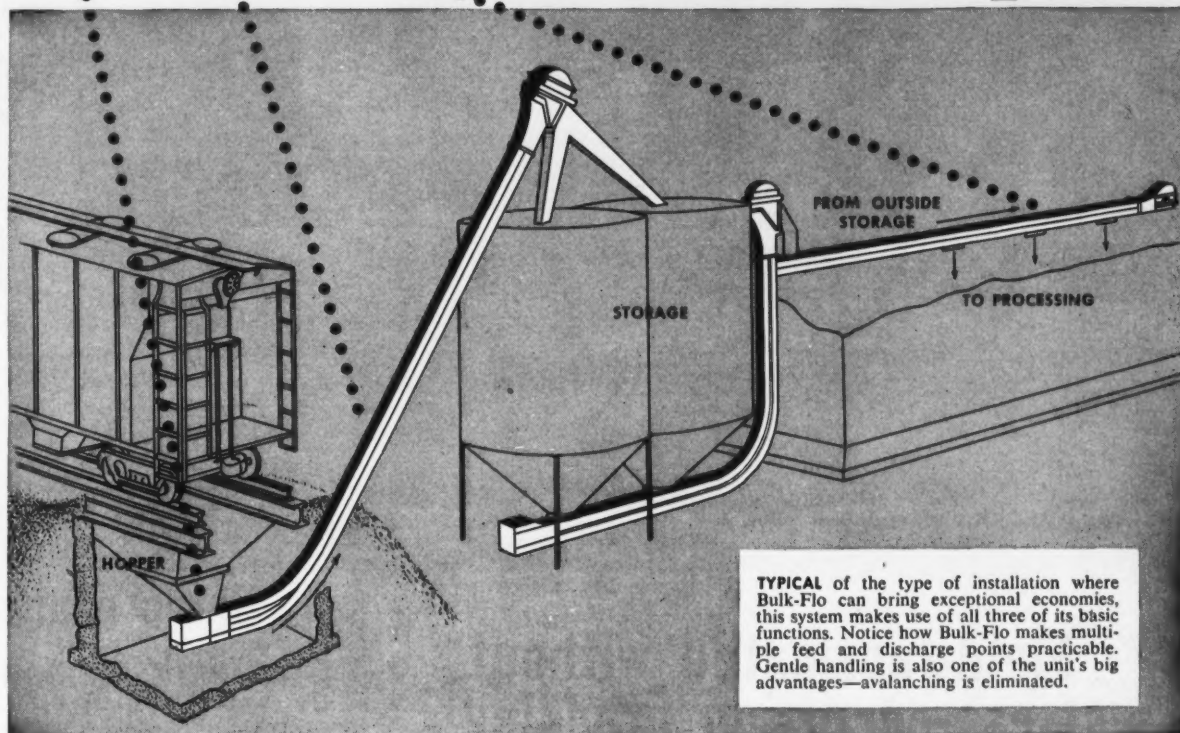
Low pressure compressors of heavy-duty type are described in eight-page bulletin which also includes detailed sectional drawing. There also is complete run-down, with illustrations, on all vital parts and features, Bul A-95 — Joy Manufacturing Company, Oliver Bldg., Pittsburgh 22, Pa.

Check 3710 opposite last page.

Liquid level gages designed for remote reading are covered in detail in eight-page catalog, Cat 338 — Jerguson Gage & Valve Co., Adams St., Burlington, Mass.

Check 3711 opposite last page.

It's a feeder! It's an elevator! It's a conveyor!



TYPICAL of the type of installation where Bulk-Flo can bring exceptional economies, this system makes use of all three of its basic functions. Notice how Bulk-Flo makes multiple feed and discharge points practicable. Gentle handling is also one of the unit's big advantages—avalanching is eliminated.

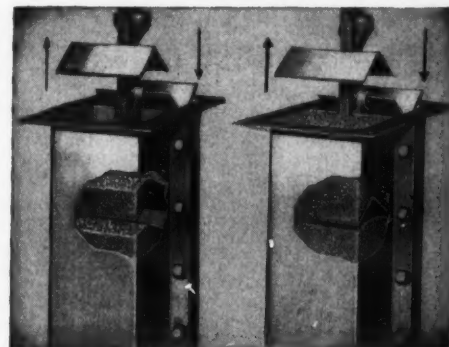
It's 3 units in 1! And LINK-BELT Bulk-Flo works equally well fully or partially loaded

WITH its remarkable ability to combine horizontal, vertical and inclined travel . . . to feed, convey and elevate using a single drive—Link-Belt Bulk-Flo is industry's most versatile medium for handling non-abrasive, non-corrosive materials. In fact, it often replaces several units—in less space and at lower cost.

Bulk-Flo will bring you the tremendous savings it has brought to so many other plants. Let a representative at your nearest Link-Belt office give you an unbiased answer. Or write for Book 2475.



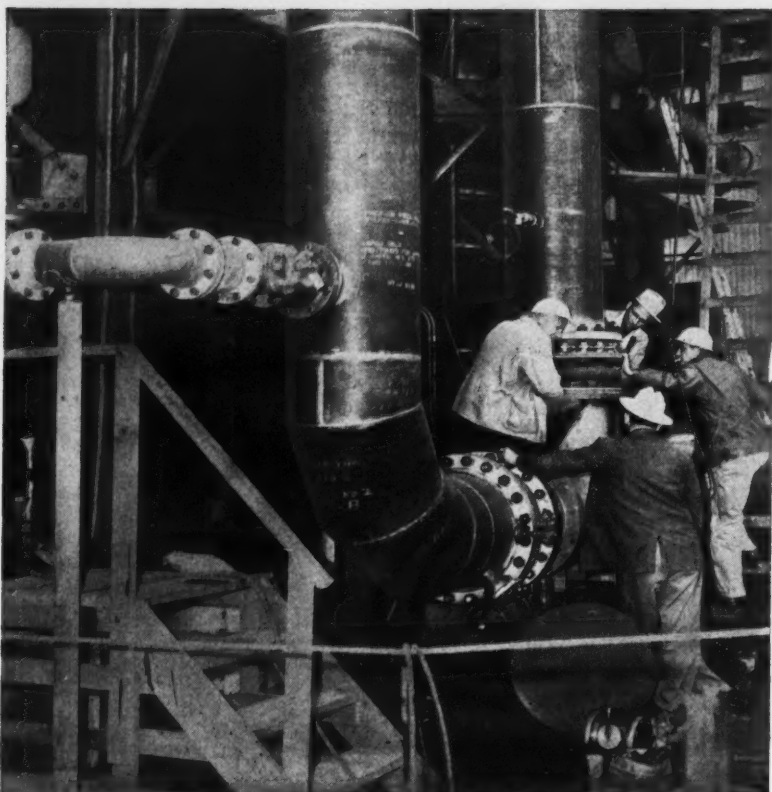
BULK-FLO FEEDERS • CONVEYORS • ELEVATORS



SOLID FLIGHTS permit Bulk-Flo to operate independently of internal pressure. Thus, it needn't be loaded to full capacity in order to provide positive movement of material. Speed is constant—capacity can be varied by merely regulating amount of feed. And regardless of load, Bulk-Flo is self-clearing.

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants and Sales Offices in All Principal Cities. Export Office, New York 7; Canada, Scarborough (Toronto 13); Australia, Marrickville (Sydney), N.S.W.; South Africa, Springs. Representatives Throughout the World.

Check 3712 opposite last page



Erecting pipe at a potash refinery in Carlsbad, N. M. operated by the U. S. Potash Co., a division of U. S. Borax & Chemical Corp. After nine months service, there is

no sign of stress-corrosion cracking—yet pipe and fittings were not stress-relieved or heat-treated during fabrication.

Field-fabricated without stress-corrosion cracking!

Pipe and fittings are of NEW AMPCO METAL GRADE 8

Forget your old ideas about fabricating copper-base alloy equipment to handle steam and corrosive media at elevated temperatures. New — entirely new — Ampco Metal Grade 8 changes all that!

Now, for example, you can get pipe and fittings that

- ... can be field-assembled, without stress-relieving — yet won't stress-corrosion crack!
- ... provide many times greater protection against corrosion and erosion
- ... can be readily welded

... can be formed on standard equipment

... are too tough to be chewed or crushed by wrenches.

... are available in all standard types and sizes — also specials.

At one major oil refinery, field-assembled piping of Ampco Metal Grade 8 has handled hot sulphuric acid sludge for a year and a half without stress-corrosion cracking.

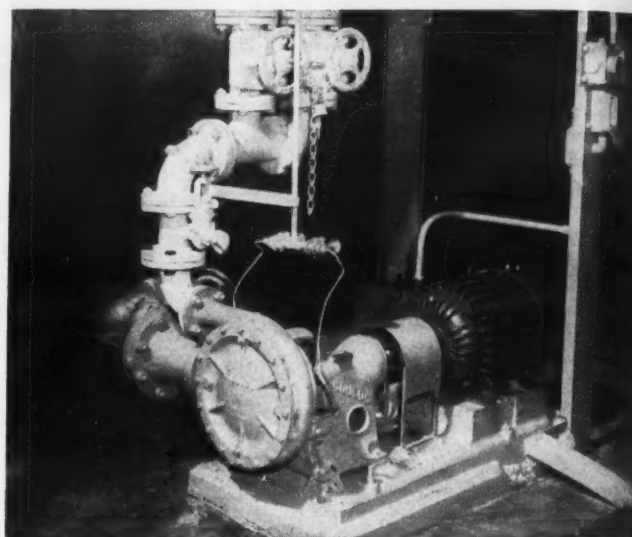
Sound promising? It is! Ask your Ampco field engineer about new, patented Ampco Metal Grade 8. Or write for details. *Ampco Metal, Inc., Dept. 131B, Milwaukee 46, Wis.* West Coast plant: Burbank, Calif. —Southwest plant: Garland (Dallas County), Texas.



AMPCO

Check 3713 opposite last page

PETROCHEMICALS



Typical installation of pump used to handle latex. This unit transfers latex from storage tanks to tank cars for bulk shipment

Constructed so they can easily be cleaned without removing from line when they become clogged with rubber, centrifugal units —

Pump synthetic rubber latex with minimum maintenance

GORDON WEYERMULLER, Petrochemical Editor
with ROY E. LEEDY, Mgr. Engineering & Maintenance
Synthetic Latex Plant
Goodyear Tire & Rubber Company, Akron, Ohio

Problem: Diaphragm and other conventional centrifugal pumps used for handling synthetic rubber latex at Goodyear Synthetic Latex Plant at Akron had high maintenance and cleaning costs. Periodically, a considerable quantity of rubber would become lodged in pump. Downtime and excessive maintenance occurred when a pump was removed from line for cleaning.

Solution: About four years ago plant started using centrifugal chemical pumps which are constructed in such a way that they are particularly suitable for handling synthetic rubber latex. Both

suction and discharge connections are located in casing. Removal of casing cover permits interior of pump to be inspected or cleaned without disturbing piping connections. Similarly, impeller may be removed or replaced without disturbing piping.

Stuffing box is on suction side of impeller. This limits pressure on stuffing box to suction head or pressure under which pump operates. This insures long packing life and freedom from excessive leakage.

Should wear eventually occur between impeller vanes and casing, provision is made

for external adjustment of clearance between these two parts.

Entire fluid end of pump can be 316, Gould-a-loy 20 (same as ACI CN 7M CU), all iron, all bronze or bronze fitted, or all iron with stainless trim.

Results: Pumps have been found highly satisfactory for handling synthetic rubber latex at the Goodyear plant. A number are already in use for this type of service and more will probably be installed.

Although exact figures are not available, substantial savings have been made since very little maintenance is required on pumps. Whenever a pump becomes clogged with rubber, it can be opened and cleaned without removing it from line.

(Fig 3715 centrifugal chemical pumps are product of Goulds Pumps, Inc., Seneca Falls, New York.)

Check 3714 opposite last page.

Protective air stream delivers touchy catalyst

Maintenance no problem



Operating continuously since April 1957, rotary positive pressure blower has provided protective air stream for sensitive catalyst

A Phillips-type polymerization process at W. R. Grace & Co.'s Polymer Chemicals Division plant at Baton Rouge, La., produces a high-density, low-pressure polyolefin, utilizing a gas catalyst. This catalyst must be delivered to the process pressurized in a protective air stream to prevent an explosive hazard.

The pressurizing air stream is developed in a rotary positive pressure blower. Several



NEWPORT NEWS BUILT two 39'-7" horizontal gas scrubbers, such as this, for J. F. Pritchard & Co. They were made of ASTM-A212 Grade B fire box steel, with structural mesh steel interiors.

Gas scrubber made of 2⁷/₈" steel

Newport News builds almost any type of pressure vessel and other heavy process equipment

Here is one of two horizontal gas scrubbers recently built for an operating pressure of 1800 psi at 300°F.

Newport News made both vessels from fire box steel, 2⁷/₈ inches in thickness. We formed and automatically welded this steel into sections having a diameter of only 4 feet.

Rolling thick steel to this small diameter...no easy accomplishment, as you probably know... demonstrates the sort of jobs Newport News takes in stride.

Almost any type of heavy processing equipment is readily constructed by Newport News in a 225 acre plant comprising huge, fully equipped fabricating and machine shops, foundries, forge and die shops, heat treating and allied equipment as well as complete test facilities.

Newport News shop erection of

fabricated units helps to speed assembly at your plant site.

Get a bid from Newport News on your present or future projects. Get the benefit of specialized production techniques. Look over the many ways in which Newport News can help you... write for "Facilities and Products", a very interesting booklet. It's yours for the asking.

ENGINEERS Desirable positions available at Newport News for Designers and Engineers in many categories. Address inquiries to Employment Manager.



ROLLING 2⁷/₈" STEEL for gas scrubbers. The steel, in a hot condition, was formed on the heavy bending equipment shown here. It will cold roll mild steel up to 3 inches thick, and will hot roll any grade of steel up to a thickness of 5 inches.

Newport News Shipbuilding and Dry Dock Company
Newport News, Virginia

Check 3715 opposite last page

**15-to-1
Turn Down
with
Uniform
Accuracy**

NEW
Kates

**TYPE "F"
FLOW RATE REGULATOR**

**NEW
IMPROVED
DESIGN**

MORE ACCURATE —

Both in flow control and
set point adjustment

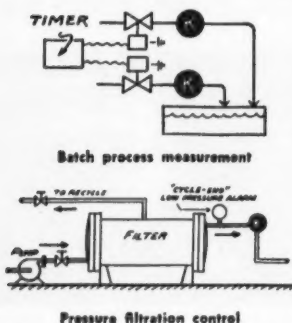
MORE ADAPTABLE —

For a wider variety of
liquids and applications

MORE FLEXIBLE —

With 15 to 1 turn down

TYPICAL APPLICATIONS



DON'T BUILD A SYSTEM —

INSTALL A

Kates

THE W. A. KATES COMPANY

Department O
430 Waukegan Road
Deerfield, Illinois

Get full details and description—
write for New Bulletin No. 581

Check 3716 opposite last page

PETROCHEMICALS

important factors govern activation of a catalyst. Positive constant pressure must be maintained in the air stream, and contamination of the catalyst must be avoided. This is accomplished by the use of Teflon seals in the blower. The rotary positive pressure blower has been in continuous operation in open air since April 1957 with no maintenance other than routine care.

Air supply for catalyst activation is 170 cfm from blower which runs at 670 rpm, and is driven by a V-belt connected to a 10 hp motor. Capacity has not diminished since plant start-up.

("California" series rotary positive pressure blower is product of Sutorbilt Corp., Compton, Calif.)

Check 3717 opposite last page.

Automatic end point recorder which determines and records the maximum temperature attained during the distillation tests of a hydrocarbon mixture is described in four-page publication. Operating range is 225 to 675°F. Bul 703 — Precision Scientific Development Co., Div. of Precision Scientific Co., 3737 W. Cortland St., Chicago 47, Ill.

Check 3718 opposite last page.

**Vary capacity range
of axial compressor
in operation**

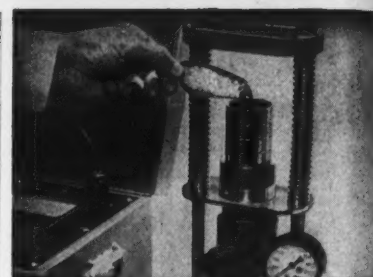
High inherent efficiencies,
part-load pressure rise

Uses: For petroleum-chemical processes, coke-oven gas exhausters and boosters, and other industrial applications.

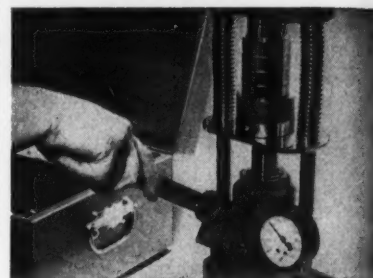
Features: Through use of adjustable inlet guide vanes and full or partial stator blade control, capacity range of compressor can be varied while machine is in operation and still retain high inherent efficiencies and part-load pressure rise.

Description: Low-cost constant speed motors can be used with axial compressor because of instantaneous compressor range adjustment design. Savings in operating costs

To page 98



FEED IT...



SQUEEZE IT...



READ IT...

**G-5 Moisture Register
for accurate moisture
tests in 60 seconds**

Fastest moisture test available with accuracy to 0%. Save production and lab time—no skilled labor needed. Use Electronic Moisture Register G-5 anywhere on granular, ground, loose, shredded and powdered materials. Hydraulic pressure assures homogeneous sample. Specially calibrated for ammonium nitrate, ammonium sulphate, toilet soaps, calcium carbonate, sulphur, ammonium perchlorate, sodium bicarbonate, polyethylene resins, many more. Accuracy guaranteed. *Ask for free trial.*

Write, stating material to be tested and moisture range, or check No. 3719 on reader service slip.

**ELECTRONIC
MOISTURE REGISTER**
Instruments

Moisture Register Co., Dept. CPC
P.O. Box 910, Alhambra, Calif.

Check 3719 opposite last page

CHEMICAL PROCESSING

THAT'S
INTERESTING

Plastic lifeboats

U.S. Coast Guard has approved the use of plastic lifeboats on all ships flying the American flag. Approval was granted lifeboat manufacturer on design resulting from two years of research and development work. Glass-fiber reinforced boat will not support combustion. It is also impervious to rot, and corrosion.

Translations directory

The Dept. of Commerce is now publishing a semi-monthly directory intended to serve as a central source of information on Russian and other technical translations available to science and industry.

It will be published in cooperation with the Special Libraries Association. SLA's *Translation Monthly* will be incorporated in the new periodical.

For more information on product at right, specify 3720 see information request blank opposite last page.



STAINLESS WASTE TRANSFER TANKS



REACTOR CONTAINMENT HOUSING

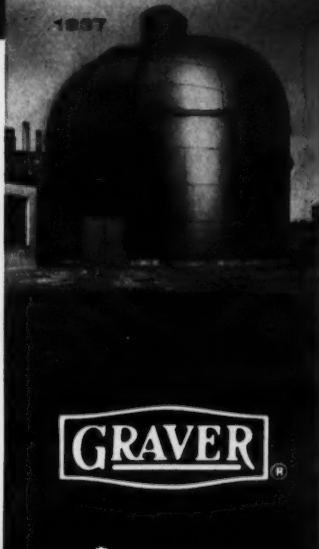
Why It Pays to Discuss Your Project With a PIONEER FABRICATOR FOR ATOMIC ENERGY

Graver's experience in fabricating and erecting containment housing, stainless, aluminum and other alloy vessels and process equipment for atomic energy dates back more than twenty years—to the housing of the MIT cyclotron in 1937. Projects by Graver for major nuclear installations include hot waste transfer and settling tanks, scrubbers and other process equipment, and containment housing for experimental, demonstration, and commercial power reactors.

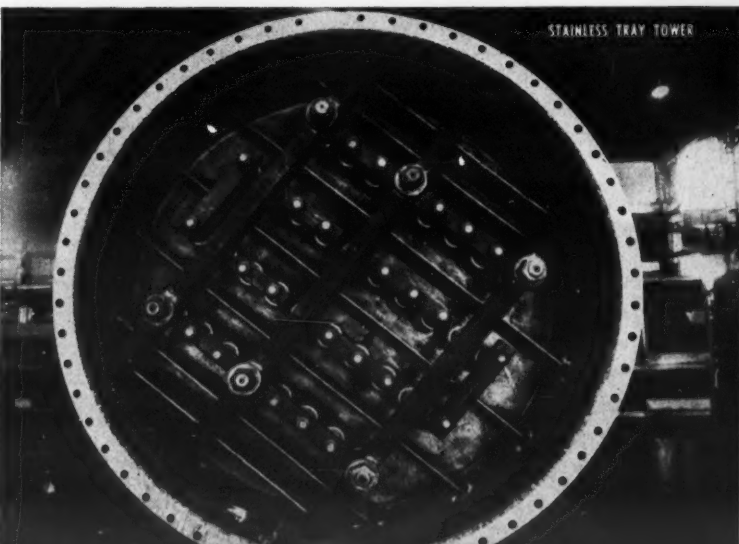
Graver fabrication experience and design skills in the atomic field have also been sought internationally, a mark of confidence in Graver craftsmanship and Graver skill in steel and alloy fabrication.

Since there is no margin for error when fabricating for atomic energy installations, experience *does* count. That's why it pays to discuss your project with Graver.

GRAVER TANK & MFG. CO. EAST CHICAGO, IND.
DIVISION—UNION TANK CAR COMPANY



GRAVER®



STAINLESS TRAY TOWER



JIG FIELD WASTE TANKS

DAY

Pneumatic Conveying & Bulk Storage News

FREE! 2 valuable guides
for selecting
**PNEUMATIC CONVEYING
and BULK STORAGE TANKS**



BULLETIN M-588—12 page DAY pneumatic conveying guide just off the press. Discusses types of systems, illustrates and diagrams high and low density arrangements, shows equipment and tells "why" and "wherefore" of all types of pneumatic conveying including so-called fluidizing systems.

BULLETIN 574—12 pages, describes horizontal and vertical storage tanks. Points out savings and is filled with photos of various installations plus description of auxiliary equipment.



Whatever your pneumatic conveying or bulk storage problem, look first in these DAY bulletins. They are valuable aids in selecting and ordering the right equipment for your plant. For your free copies use reader service card of this magazine or write direct to DAY.

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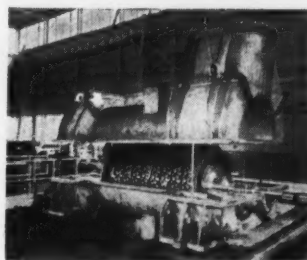
EQUIPMENT ONLY OR A COMPLETE SYSTEM

Check 3721 opposite last page

PETROCHEMICALS

From page 96

are achieved through elimination of inefficient blow-off, bleed-in, recirculation, or any



Increased flexibility and broadened capacity range are features of axial compressor

combination of these methods normally required when operating standard compressors with constant-speed drives.

Control of range extension devices can be accomplished in several ways. Simple method consists of hand wheel mounted on compressor. Another method utilizes hydraulic cylinders or electric motor actuators. Actuators can be used either with remote manual control consisting of sub-panel with selector knob, or their operation can be tied directly into process.

(Axial compressor is product of Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.)

Check 3722 opposite last page.

Gas turbines, their design features, types of fuels, plus applications are detailed in 16-page Bul 167 — Clark Bros. Co., one of the Dresser Industries, 617 Lincoln Ave., Olean, N. Y.

Check 3723 opposite last page.

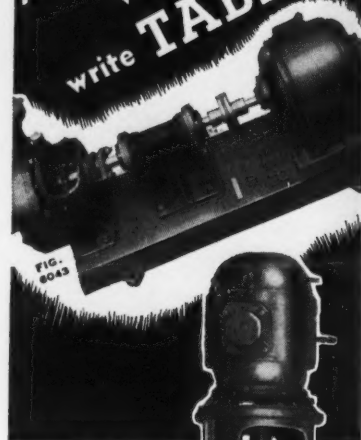
Precision pressure gages for severe or dangerous services are described and illustrated in 36-page booklet. Cat DH-65 — Helicoid Gage Div., American Chain & Cable Co., Inc., Bridgeport 2, Connecticut.

Check 3724 opposite last page.

Stainless steel heat exchangers, in 19 sizes and with different designs, are covered in four-page bulletin. Bul 301.6K1 — Ross Heat Exchanger Div., American-Standard, Buffalo 5, N. Y.

Check 3725 opposite last page.

PUMPS
of NICKEL, MONEL
or CHROME-NICKEL
ALLOYS but only for the
WETTED END
write **TABER**



Because at Taber, your PUMP NEEDS will receive the personal attention of highly specialized pump engineers... your objectives are most likely to be realized. Many of the oldest, largest and most respected producers in the chemical industry have and are using both Taber service and pumps.

NOTE, the vertical design pump permits locating stuffing box above and out of liquid level... nothing to leak. Horizontal Pumps, write for Bulletin C-355. Vertical, Bulletin V-837.

**TABER
PUMP CO.**

Est. 1859
291 ELM ST.
BUFFALO 3, N. Y.

K-481

TABER

Check 3726 opposite last page

CHEMICAL PROCESSING

U.S.I. CHEMICAL NEWS

★ A Series for Chemists and Executives of the Solvents and Chemical Consuming Industries ★

Market for Rigid Urethane Foams Growing Rapidly

While rigid materials accounted for less than 10% of the total polyurethane foam market in 1957, 1958 figures are expected to show an increase to more than 20% of the total market. The Society of the Plastics Industry feels that by the end of 1959, 30-40% of the demand will be for the rigid foams.

The material is proving ideal for industrial and home insulation. Packaging applications are expanding. Makers of marine equipment are using the rigid foams for buoyancy. Military applications include radiation shields and heliohuts. More and more, structural panels and laminates are being made with rigid urethane foams.

Users can buy fabricated foam or they can foam the material themselves in place, by employing either molding or spraying techniques. Special equipment has been developed for spraying urethane polymer onto overhead, vertical or irregular surfaces. It foams and sets in place rapidly to give a rigid coat which will not slip, sag or fall away.

Rigid urethane polymers are formed by mixing two chemical components—polyisocyanates and polyesters. Carbon dioxide gas is given off during the reaction and it serves as a blowing agent which causes the polymer to foam in place. An intermediate that can be used to produce the polyester component is ISOSEBACIC® acid, a mixture of C-10 dibasic acids. ISOSEBACIC acid will be available soon in commercial quantities from a new U.S.I. plant at Tuscola, Illinois.

"Stabilized" Polyethylene Fabrics Now Being Made Via New Finishing Process

A patented technique for finishing polyethylene fabrics is now being employed to improve shrink resistance, strength, appearance and other physical characteristics. According to the patent, conventional finishing methods for polyethylene fabrics—calendering or hot fluid treatment of the greige goods to preshrink them—result in loss of yardage, strength and optimum appearance.

The patented process involves the pretreatment of oriented polyethylene filaments before conversion to give them a residual shrinkage of 8-20% (tested at 75°C for 20 minutes). The filaments are then converted to greige goods, in which they have a wavy form.

The greige goods are subsequently held along both the length and width to prevent retraction and are heated at a strictly controlled temperature for a limited time. So held and treated, the filaments in the fabric shrink to the extent of their residual shrinkage and straighten out, without reducing the area of the fabric.

By comparison with fabrics finished by conventional methods, these materials are said to have better appearance, strength and aging properties. The process is claimed to provide economies in operation—to save yardage and to reduce the number of finishing steps required.

Gov't. Authorizes Substitutions In SDA 40 Alcohol Formulation

Shortage of Brucine Denaturant Made Modifications Necessary.

SDA 40, which the U. S. Government authorizes for use in toilet goods, external pharmaceuticals, biocides, detergents, etc., has been formulated until now with $\frac{1}{4}$ gallon of *tert*-butyl alcohol plus 3 ounces of brucine alkaloid or 3 ounces of brucine sulfate per 100 gallons of ethyl alcohol. To relieve difficulties of denaturants and users of this formulation due to a critical shortage of brucine, the Internal Revenue Alcohol and Tobacco Tax Division (A. & T. T. D.) has authorized the formulation of SDA 40 with $\frac{1}{4}$ gallon of *tert*-butyl alcohol plus either 1½ ounces of brucine alkaloid, or 1½ ounces of quassin per 100 gallons of ethyl alcohol.

How the Substitutions Came About

When the brucine shortage first became acute, an inability to meet customer requirements for SDA 40 threatened to upset the entire industry. Recognizing the situation, the A. & T. T. D. authorized quassin as an alternate denaturant.

While brucine is one of the bitterest materials known, quassin had been tested and found sufficiently bitter and acceptable from other standpoints to serve as an alternate denaturant. Quassin had been used as a denaturant in Canada for 25 years, and this experience dispelled concern about possible adverse effects arising from its use.

Samples of SDA 40 denatured with quassin were offered to the trade, and users were urged to make up their products with this alternate, to assure compatibility with their formulas. After testing, many customers advised that they would accept SDA 40 alcohol with this denaturant.

However, realizing that limitations on the supply of quassin made it an incomplete answer to the shortage, the A. & T. T. D. took quick action to extend existing supplies of brucine by authorizing denaturation with reduced quantities of brucine alkaloid and

MORE

Vitamin C Indicated for Virus & Other Infections

Several medical investigators have found that continuous massive doses of ascorbic acid (Vitamin C) are effective in treating virus diseases such as poliomyelitis, measles and virus pneumonia; bacterial infections such as tuberculosis and scarlet fever; and cases of poisoning such as snake bite and lead poisoning. The range of antibiotic and antitoxic action is said to be unusually broad, and, in addition, there is claimed to be complete freedom from allergic or toxic reaction.

Intravenous or intramuscular injection is the preferred method of treatment. When so administered, ascorbic acid is said to compare favorably with sulfa drugs and mycelial antibiotics. Effectiveness of the therapy is reported to be dependent upon the potent oxidation-reduction action of ascorbic acid, which rapidly neutralizes viral or bacterial toxins.

Ascorbic acid occurs naturally in citrus and other fruits, as well as green leafy vegetables. One method of producing it synthetically is by using L-sorbose as the starting compound and employing sodium methoxide in the final (enolization) step of the synthesis.

Index of Chemical Patents Now Being Prepared

Every patent relating to chemistry which has been issued by the U. S. Patent Office since 1950 is being collected and indexed for reference purposes by a Washington information service. The collection is being kept current and is being made available on a subscription basis to chemical companies, libraries, educational institutions and other interested organizations.

At the moment, indices for 1955, 1956, 1957 and the first 10 months of 1958 are available. They cover 30,000 patents. A trained staff of chemists and biochemists is now working on the indices for 1950-1954, which will add another 40,000 patents. It is estimated that when this work is completed, in about two and one-half years, more than 100,000 patents will have been collected and indexed.

It is claimed that the indexing method used analyzes, edits, classifies and cross-indexes U. S. chemical patents into the fastest and most accessible reference system ever devised.

SDA 40 AUTHORIZED USES (Under Permit)

- Hair and Scalp Preparations
- Bay Rum
- Lotions and Creams (Hand, Face, Body)
- Deodorants (Body)
- Perfumes and Perfume Tinctures
- Toilet Water and Colognes
- Shampoos
- Soaps and Bath Preparations
- External Pharmaceuticals (not U.S.P. or N.F.)
- Disinfectants, Insecticides, Fungicides and Other Biocides
- Cleaning Solutions (including Household Detergents)
- Theater Sprays, Incense and Room Deodorants
- Miscellaneous Dye Solutions
- Miscellaneous Solutions

U.S.I. CHEMICAL NEWS

CONTINUED

Alcohol

brucine sulfate. Consequently, there are now three new SDA 40 formulations approved by the Alcohol and Tobacco Tax Division. U.S.I. designations are shown in the box below.

U.S.I. Designations for New SDA 40 Formulas

SD-40-1M1½ oz. brucine alkaloid
SD-40-2M1½ oz. brucine sulfate
SD-40-31½ oz. quassin

U.S.I. Studying Alternate Denaturants

Because brucine and quassin derive from natural imported products, there is always the possibility that the supply of these denaturants might be inadequate at some future date. U.S.I.'s research laboratories are therefore continuing studies to develop suitable additional alternates.

Ideally, alternate materials suitable as denaturants should be synthetic and domestically produced. Once found and tested in end-use formulations, such stand-by alternates—pending approval by the government—would assure denatured alcohol consumers of an uninterrupted flow of raw material at all times.

Methionine-Hormone Formulation Effective For Treating Acne

Clinical studies have revealed that a formulation of DL-acetyl methionine, estrogenic hormone, colloidal sulfur and resorcin applied to the skin is effective for treating acne conditions.

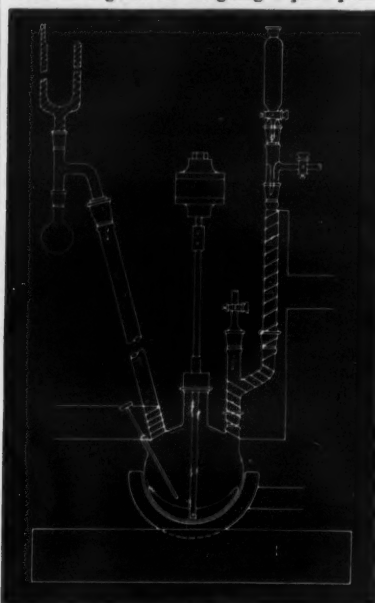
The medical research workers who conducted these studies found that methionine—the sulfur-bearing amino acid—and the estrogenic hormone act synergistically to reduce the excessive secretion of fatty materials from the sebaceous glands—a characteristic condition in acne cases. Consequently, the formulation dries and heals the acne lesions rapidly.

For optimum results, the treatment was supplemented with dietary and hygienic routines, and small oral doses of thyroid extract and estrogenic hormone.

Pure Sodium Alkoxides Can Be Made by Dry-Way Process

A new technical bulletin just released by U.S.I. describes a valuable but little-known technique for preparing sodium alkoxides from metallic sodium and alcohol vapors. This low-cost, dry-way process yields powders which are high-analysis alkoxide, in contrast to the 16-18% alkoxide solutions produced by the usual method of introducing sodium into liquid alcohols. It provides a way for pharmaceutical and other manufacturers who make their own alkoxides to get a high-purity material.

Products are almost identical in analysis to commercially available alkoxides. Although the bulletin describes the laboratory technique of passing vaporized alcohols over molten sodium, sufficient data is available to serve as a guide in designing a pilot plant.



Laboratory apparatus for dry-way preparation of sodium alkoxides.

TECHNICAL DEVELOPMENTS

Information about manufacturers of these items may be obtained by writing U.S.I.

L-Methionine, labeled with both carbon-14 and deuterium (methyl-C¹⁴D₃), can now be obtained for research purposes. This amino acid is reported useful in studying the mechanism of ergosterol. **No. 1430**

Cosmetic technology is discussed in new, 1450-page book now being sold. In 53 chapters, 61 experts cover over 3 dozen types of products. Includes technology, historic and legal aspects, physiology, testing, manufacture. **No. 1431**

Slide rule for chemists has special scales for solving pressure, temperature, solution concentration problems on one face, standard scales on other face. Gives atomic wts. of 52 elements, molecular wts. of 18 atomic groups. **No. 1432**

Chloromethoxypropyl mercuric acetate solutions now available in commercial quantity. Fungicidal and bactericidal activity claimed superior to phenyl mercuric compounds, due partly to presence of labile chlorine atom. **No. 1433**

Uses of stainless steel in CPI discussed in newly revised, 40-page free booklet. Sections on fields of plastics, detergents, nuclear power, others. Includes corrosion resistance table and table comparing stainless grades. **No. 1434**

Full line of polyesters for producing rigid or flexible urethane foams can now be obtained commercially. For rigid products, combinations of prepolymer and polyester are offered for foaming in place by mixing or spraying. **No. 1435**

Long-path infrared system recently developed is said to detect evaporation from one drop of a predetermined chemical in an average room. System senses the chemical by its IR spectrum, is not usually sensitive to other materials. **No. 1436**

Polyethylene work gloves now on market are claimed to provide protection without loss of fingertip sensitivity. Are lightweight, waterproof, resistant to most chemicals. Said to be suitable for use with radioactive materials. **No. 1437**

Comprehensive file of trademarks used by CPI here and abroad is now available for reference at a charge. Includes registered, unregistered, common, scientific, technological names. Composition, uses, producer given in many cases. **No. 1438**

New analytical-grade ion-exchange resins based on cellulose are claimed suitable for chromatographic fractionations of high-molecular-weight materials beyond range of conventional resins. Are extremely porous and hydrophilic. **No. 1439**

PRODUCTS OF U.S.I.

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Ethyl Alcohol (Ethanol): Specially denatured — all regular and anhydrous formulas. Completely denatured — All regular formulas for industrial use, anti-freeze. Pure alcohol—USP 190°—Absolute, N.F., taxfree, taxpaid.

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OTHER PRODUCTS

Organic Solvents and Intermediates: Normal Butyl Alcohol, Amyl Alcohol, Fusel Oil, Ethyl Acetate, Normal Butyl Acetate, Diethyl Carbonate, DIATOL®, Diethyl Oxalate, Ethyl Ether, Acetone, Acetoacetanilide, Acetoacet-Ortho-Chloranilide, Acetoacet-Ortho-Toluidide, Ethyl Acetoacetate, Ethyl Benzoylacetate, Ethyl Chloroformate, Ethylene, Ethyl

Sodium Oxalacetate, Sodium Ethylate, ISOSEBACIC® Acid, Sebacic Acid, Urethan U.S.P. (Ethyl Carbamate), Riboflavin U.S.P., Pelargonic Acid, 2-Ethyl Heptanoic Acid.

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Heavy Chemicals: Anhydrous Ammonia, Ammonium Nitrate, Nitric Acid, Nitrogen Fertilizer Solutions, Phosphatic Fertilizer Solution, Sulfuric Acid, Caustic Soda, Chlorine, Metallic Sodium, Sodium Peroxide, Sodium Sulfite, Sodium Sulfate.

Animal Feed Products: Antibiotic Feed Supplements, BHT Products (Anti-oxidant), Calcium Pantothenate, Choline Chloride, CURBAY B-G®, Special Liquid CURBAY, VACATONE®, Menadiolone (Vitamin K₃), DL-Methionine, MOREA® Premix, Niacin USP, Riboflavin Products, Special Mixes, U.S.I. Permadry, Vitamin B₁₂ Feed Supplements, Vitamin D₃, Vitamin E Products, Vitamin E and BHT Products.



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Aromatics

From page 25

million gal total, about 220 million gal will be from coking operations and 230 million gal from petroleum. To this must be added the nearly 50 million gal imported annually, which brings potential supply up to approximately 500 million gal.

Today's requirements are about 335 million gal, so it doesn't take a very searching look into the crystal ball to determine that it will be quite a few years yet before we can hope to "occupy" our domestic benzene capacity, even if imports dry up.

Higher Purities Due

Another factor is that steel companies and others making benzene from coke have installed facilities to make benzene in a higher purity to compete better with petrochemical benzene.

More coal tar benzene is now being upgraded in purity

Importing aromatic hydrocarbons at a time when there is considerable over-capacity right at home has stirred an ever-mounting controversy in the chemical processing industry. Mr. Tracy is outspoken in his views. Do you agree or disagree with him? The editors of CHEMICAL PROCESSING welcome your opinions on this subject and invite your comments. Just write to "Aromatics Forum," CHEMICAL PROCESSING, 111 East Delaware Pl., Chicago 11, Ill.

by a process licensed by Esso Research and Engineering Company.

The Soviets can be blamed for the queasy naphthalene market situation. If it were not for imports — principally from behind the Iron Curtain — requirements of this product would be more nearly in balance with supply.

Rising prices of materials and transportation, higher

For more information on product at left, specify 3727 . . . see information request blank opposite last page.



**If Your Tubing or Piping Application Requires Corrosion Resistance
Here's The Plus The Job Needs...**

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The resistance to corrosion of a given grade of stainless steel depends upon its heat treated condition. For instance—the austenitic grades of stainless steel, such as the 18-8 group, have optimum resistance to corrosion only when they have been heated to certain high temperatures which "dissolve" all the carbides and then are rapidly cooled to keep these carbides "in solution."

The illustration shows a B&W Stainless Steel Tube leaving the heat treating furnace. In a little over a foot of travel and in a couple of seconds, the temperature of the tube is reduced from around 2000 F. to one where the operator can place a bare hand on it without harm. This tube offers maximum resistance to general corrosion.

At B&W the heat treatments of all grades of stainless tubing are rigidly controlled. And the same type of controls are on B&W Welded as are on B&W Seamless stainless tubular products. And the same kind of specialized care is given to tubular products intended for distributor stocks as that

given to material intended for direct shipment to the user.

For virtually any application—pressure or mechanical—B&W can provide either seamless or welded stainless tubing in any number of grades, in a broad size range, and with the properties needed for optimum service life and ease of fabrication. For stainless steel tubular products—specify B&W and be sure.

The Babcock & Wilcox Company, Tubular Products Division, Beaver Falls, Pa.



TA-7007-PG4

Seamless and welded tubular products, seamless welding fittings and forged steel flanges—in carbon, alloy and stainless steels

Check 3728 opposite last page

Aromatics

From preceding page

wages, and other increasing costs emphasize the seriousness of competition from cut-rate imports. So there seems little doubt that we will have to live with rather meager realizations on aromatics for some time. A return to happier days appears predicated upon more efficient operating units and in a better balance between market requirements and producing capacity. It would be nice to say that this better balance will come with a lessening of competition from foreign benzene and naphthalene, but such a trend is not apparent.

Educating Engineers

From page 28

whereby universities or colleges can be kept busy with applied research necessary for teachers to do the best possible job of educating students, thereby obtaining the best results for industry without outside influences. Otherwise, teachers must be given sufficient time to engage in pure research.

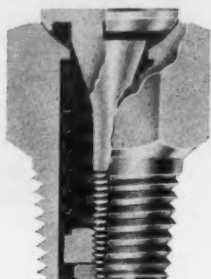
But it would not be proper that industry should foot the bill for all of this. It is important that industry and institutions of higher learning seek new patterns of liaison between fundamental research activities of a school and the more directed, committed research of industry so that cross-fertilization may be encouraged while recognizing and protecting the specialized functions of each. In all cases, industry must recognize the responsibility for educating the engineer to full professional status.

Industry must also support the tendency that only graduates of universities or colleges with a master's degree or a Ph. D. are to be considered engineers, and that there cannot be another place to educate men of technical bent to become so-called engineers.

We do not wish to take sides in this dispute, but we con-

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See Our Catalog in
Sweet's Product Design File



Check 3729 opposite last page

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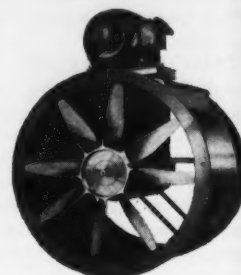
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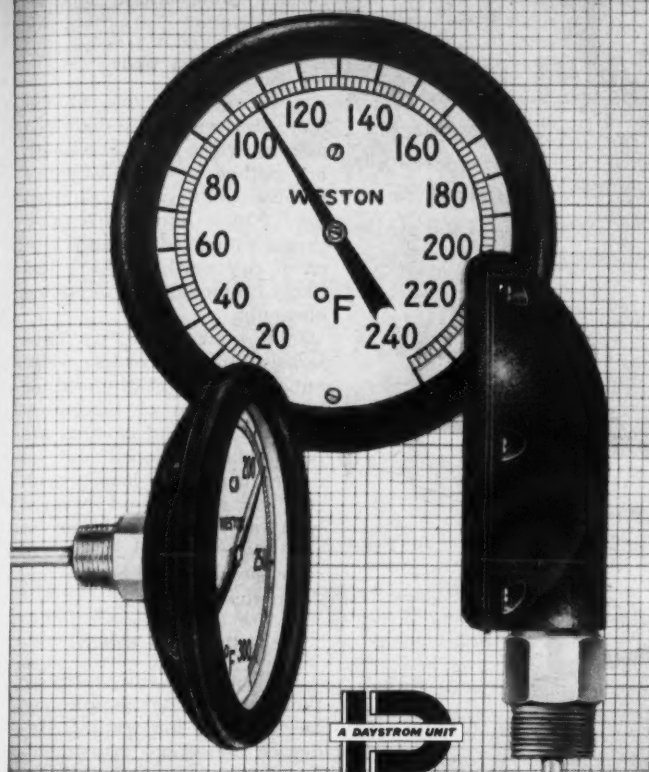
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Catalog 09-100 contains full information. Contact your local *Weston* representative, or write to *Weston Instruments*, Division of *Daystrom, Inc.*, Newark 12, N. J. In Canada: *Daystrom Ltd.*, 840 Caledonia Rd., Toronto 10, Ont. Export: *Daystrom Int'l.*, 100 Empire St., Newark 12, N. J.

WESTON
Instruments

Check 3731 opposite last page

tend: We must find a solution or we will never raise industry to the level considered best for our country. Only the sincere effort of everyone working in the same direction will again bring the U. S. into the first line of scientific endeavor.

One of the first things to be decided is what constitutes pure or basic research and which is applied research. Their limits are not clearly defined, making a decision difficult.

One can be certain that universities should be engaged in activities necessary to meet functions of institutions of higher learning and, doing this, it is obvious to a great extent that sponsored research activities should not only support individual faculty members, but it should give them possibilities to teach the newest in technical advances.

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Radioactive materials disposal methods safe, permanent

Geneva peace atoms parley
told about different ways

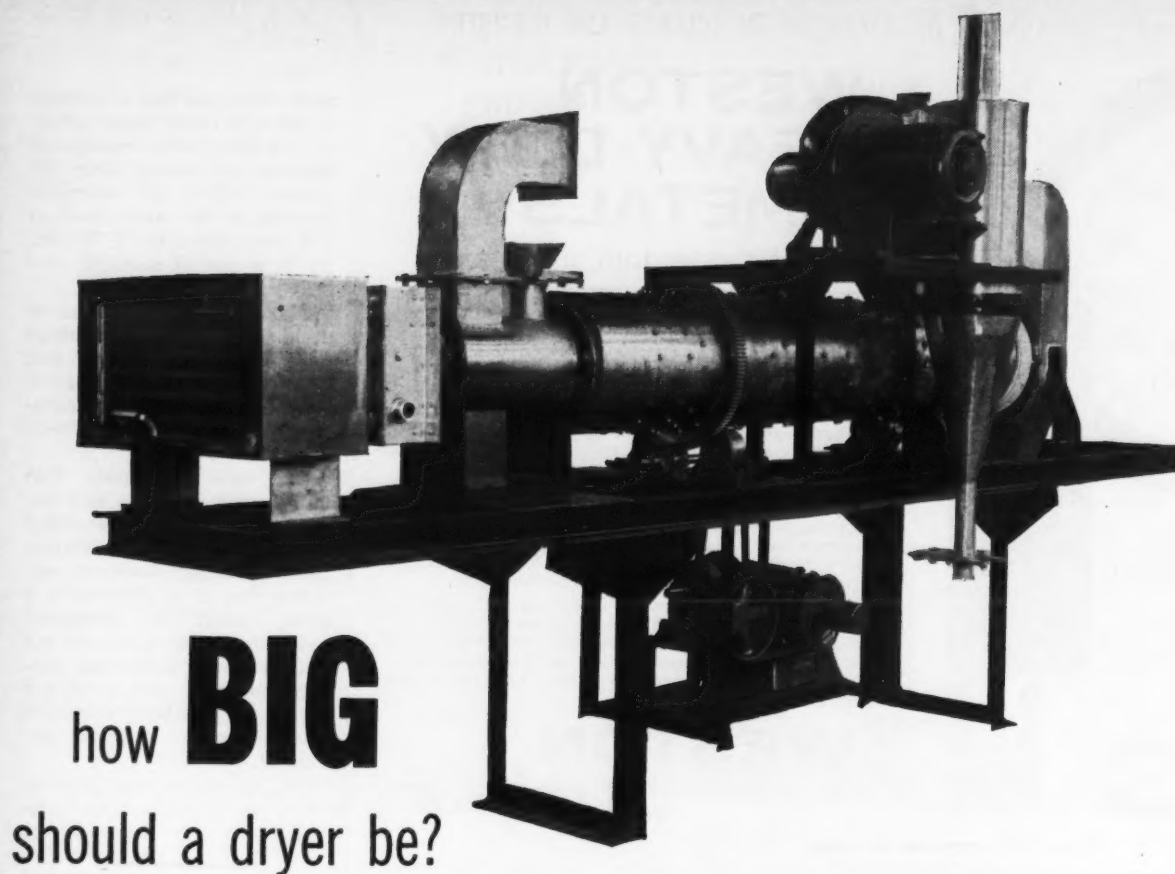
How three billion gallons of radioactive liquids have been safely and permanently disposed of at American atomic plants was described at the second international Atoms for Peace conference held in Geneva, Switzerland.

Delegates were told liquid waste has been dumped into the ground without danger of radioactive materials getting into public water supplies by using various disposal methods which range from digging reverse wells to seepage pits.

Most wastes emanate from chemical plants where irradiated atomic fuel is processed, and its disposal depends upon various types of soil.

As an example, the Hanford, Wash., atomic plant is in a high desert basin with up to

Check 3732 opposite last page



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Check 3733 opposite last page

300 feet of dry soil between surface and natural underground waters.

Reverse Wells

Reverse wells, one of the first devices tried—involved pouring waste into deep holes, but method was unsatisfactory because wells quickly plugged up. Also, liquid passed through much of the deep layer of dry earth, making less likely removal of offending elements.

Cribs and caverns have largely replaced reverse wells, but the latter still are used for small amounts of laboratory wastes. Cribs and caverns are large holes scooped out of desert floor, filled loosely with rock or gravel, and covered with a protective layer of sand. Waste piped into them seeps slowly out of bottom and down through soil.

Wells Drilled Nearby

Wells are drilled nearby so that ground water samples can be removed for testing. Radiation detection instruments are lowered to check on movement of wastes through soil. Crib is abandoned when offending elements in waste approach ground water. Only part of radioactive material reaches water, and its movement is so slow that practically all radioactivity dies away by natural decay before waste material gets to plant boundary.

A system of three artificial basins has been set up at Savannah River plant in South Carolina for each of two separations plants. Wastes sent to first basin flow slowly to second, then on to third. Solids settle out in first two basins, while liquid seeps out at bottom of third. By the time seepage reaches ground water, natural radioactive decay and chemical removal by soil has rendered it harmless.

Seepage pits are in use at Oak Ridge, Tenn., where laboratory relies on natural decay and extreme dilution in natural waters to bring about safe concentrations of radioactive wastes.

(Information based on paper presented at Geneva by Dr. D. W. Pearce, General Electric Company's Hanford Works, Richland, Wash.)



IDEAS:
from other industries
and nuclear field —
new trends in research,
processes, services

Availability of tough plastic membranes brightens outlook for an old but heretofore only limitedly used process. Boasting long service life with minimum maintenance, units pave the way for large-scale use in . . .

Separating Acids and Chemicals by DIALYSIS

DEVELOPMENT of acid-resistant vinyl membranes has opened the door to a wide range of applications for dialysis in chemical processing operations. Although discovered over 100 years ago, the process has found only limited use to date — its one main commercial application being recovery of caustic from alkaline steep liquors in the viscose rayon industry.

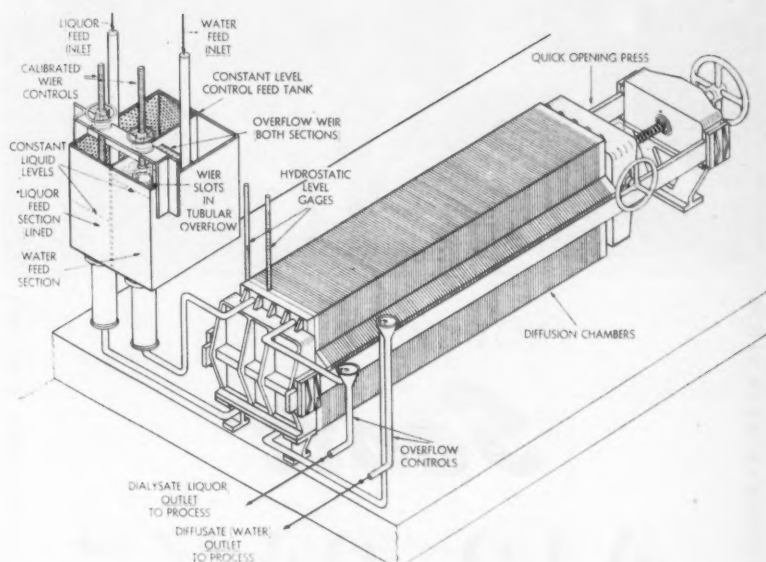
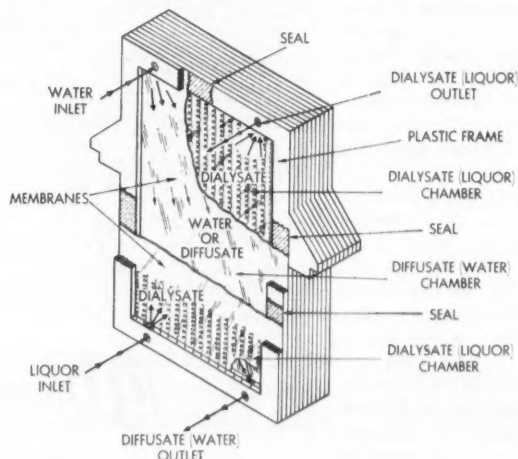
Major drawback, of course, has been inability of the conventional parchment-type membranes to withstand acids. The plastic units have whipped this problem. The tough vinyl membranes with-

stand temperatures up to 120°F, need little if any maintenance, and are said to last at least two years.

Examples of acid recovery applications for the dialysis equipment include sulfuric acid in ore processing; hydrochloric acid in ore reduction; hydrofluoric acid in pickling and glass etching; nitric acid in metallurgy and photo-engraving; and chromic acid in process engraving, anodizing, and other operations. In all of these, purification of the acid not only makes it available for reuse, but it makes the products in the main liquor stream more readily recoverable.

Process can also be used to remove inorganic acids and salts from such materials as gelatin, glue, latex, sugar, and

Membranes have 0.032" effective film thickness, are mounted on 1/4"-thick plastic frames



protein, and for other chemical separations.

Dialysis system consists of a feed tank and a plate-and-frame type unit forming the diffusion chambers

Equipment Design

Dialysis is a diffusion process whereby specific molecules in a liquor can be separated by being passed through a semi-permeable membrane. Equipment consists essentially of a feed system and a structure to hold the membranes. The dialysis unit has plate-and-frame filter press design. Alternate liquor and water cells are formed by the frames and membranes. Entire assembly is held firmly together by a hand-operated screw.

Frames on which membranes are mounted are made of 1/4"-thick plastic. Membranes have 0.032" effective

film thickness, with actual thickness of 0.0045". Spiral separators between membranes maintain effective operating area in each cell.

All supporting members and pipe are made of metal — steel, stainless, or cast iron. Feed tank is located about 10 to 12' off floor to provide adequate head for gravity flow through system.

Size of dialysis unit depends on number of membranes used. Equipment stands about 4' high. Large units measure between 10 and 12' long. Medium membrane size is 20 by 30". Entire system, including feed tank and

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IDEAS

flow regulators, comes as packaged unit. No power is needed except for pumping liquids into feed tank.

Operation

In operation, controlled quantities of water (ordinary tap water is okay) and liquor from feed tank enter dialysis portion of system, flowing along conduits formed by joined ports of the membranes and frames. Liquor travels along bottom and water through top.

Liquor entering each cell passes upward and diagonally across membrane, leaving at top. Water in its cells takes opposite course, passing downward, across, and out the bottom.

This cross and counter flow assures greatest separation by providing longest possible holdup time and lowest acid concentration difference at every point across the membrane where diffusion takes place. Liquids flow out of unit continuously and are collected in separate receiving tanks.

Capacities and Results

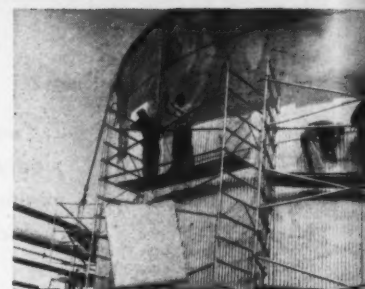
Depending upon size of equipment, feed rates of 50 to 500 gph or more are possible. Acid recovery of up to 90% can be achieved. On an hourly basis, this can result in up to ½ ton of recovered product.

As a general rule, the lower the operating rate, the higher the recovery because more holdup time is allowed. Lower rates are used when a less-than-pure solution is acceptable, since increasing holdup boosts possibility of impurities passing through membrane. Purest solutions are achieved at highest operating rates.

System operates on continuous basis. Once it is started, very little supervision is required. Part-time service of a single operator, to check that feed and circulating pumps are functioning, is all that is necessary.

Downtime, a serious limitation in the past due to deterioration and need for replacement

To page 106



G-B ULTRALITE DISTRIBUTORS

(See ad on facing page)

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ALBUQUERQUE, Mt. States Insulation Co.
AMARILLO, McDonald Engineering & Insulating Co.
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RALEIGH, N.C., Reynolds Aluminum Supply Co.
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**They compared
efficiency,
permanence,
and applied cost
...and bought
ULTRALITE®**

FOR INFORMATION AND PROMPT DELIVERY,
CALL YOUR LOCAL ULTRALITE DISTRIBUTOR
LISTED IN ADJOINING COLUMN

You, too, can get a deluxe tank insulating job at low cost—simply use ULTRALITE flexible glass fiber blankets that can be applied to tanks, vats and vessels in a *fraction* of the time required by rigid blocklike materials. Compare thermal efficiency and you'll be favorably impressed with ULTRALITE'S low "K" of .27 at 70° mean temperature. Compare permanence and you'll find that ULTRALITE covered with metal weatherproofing sheets lasts indefinitely, requires no maintenance.

ULTRALITE is available in rolls up to 10' in width and in thicknesses up to 6". Whether you elect to wrap tanks with an entire roll at a time or to hoist precut sizable sections to the work area, you get a better job at lower cost with ULTRALITE, *the only insulation made exclusively of long, strong, textile-type glass fibers.*

GUSTIN-BACON Manufacturing Co. 

254 W. 10th St., Kansas City, Mo.

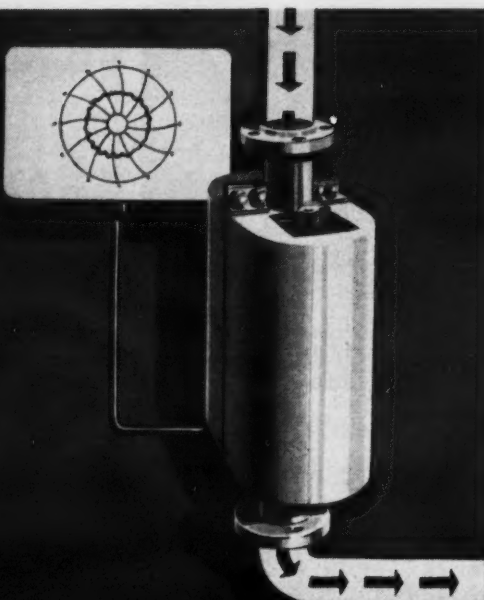
Thermal and acoustical glass fiber insulations . . . molded glass fiber pipe insulation
Plain and grooved end couplings and fittings

For more information on product at left, specify 3735 see information request blank opposite last page.



CURTISS-WRIGHT DENSITY GAUGE

An "on-the-line" density check for liquids and free-flowing solids that speeds production, cuts costs



Now you can know that your product is up to standard concentration—can for can, bottle for bottle, package for package. The Curtiss-Wright Density Gauge, mounted on pipes or other carriers from ½" to 36" in diameter, provides continuous reading and recording of the density of any free-flowing material.

Using radiated nuclear energy from a sealed source, not touching the product, the gauge can read the density—record—and automatically control it.

Either of the two designs—one for light, another for heavy industry—may be located remotely. Advanced Curtiss-Wright engineering provides long-term reliability—minimum maintenance.

WRITE FOR FULL DETAILS TODAY



INDUSTRIAL CONTROLS DEPARTMENT
ELECTRONICS DIVISION

CURTISS-WRIGHT
CORPORATION • CARLSTADT, N. J.

Check 3736 opposite last page

IDEAS

Hi-Sep Dialysis

From page 104

ment of the parchmentized paper membranes, is minimum. The vinyl membranes have a high tensile strength, are sturdy, and stay on line for long periods of time.

Units are said to be able to do two or three times the work of conventional processing equipment, at a fraction of the capital investment. Costs, depending upon size, range from \$3000 to \$20,000.

There are some limitations to the equipment. A basic one is need for sufficient concentration gradient in the liquor to supply driving force necessary for diffusion. Removal of low-concentration materials must also be carefully studied. Temperatures higher than 120°F in liquors may be harmful to the plastic membranes. Liquors should be relatively clear, with minimum sludge content.

(Further information about Hi-Sep dialysis systems may be obtained from Graver Water Conditioning Co., Division of Union Tank Car Company, 216 West 14th St., New York 11, New York.)

Check 3737 opposite last page.

Mud reclamation barge cuts drilling fluid costs at Gulf Oil

Pump on barge can move walnut shells at 450 gpm

Expensive oil well drilling fluids that used to be discarded at completion of drilling an oil well, are being recovered by means of an efficient mud reclamation barge at Timbalier Bay oil fields, Lafourche Parish, Louisiana. Use of the barge has greatly cut overall field drilling mud costs. Fluids cost from \$5 to \$17 per bbl and range in density from 11.0 to 17.5 lb per gallon.

Because main portion of oil field lies in water varying in depth from sea level to 8 ft, drilling operations are conducted from barges. Rigs used to become so heavily laden with surplus volumes of drill-

Protects Metals Against Hot Acids, Acid and Sulfurous Fumes, Salt Spray Steam, Mild Alkalies Up to 600° F.



Markal "D-A" Coatings will protect metal against any corrosive action. It is an ideal product for ore sintering plants, plating plants, food

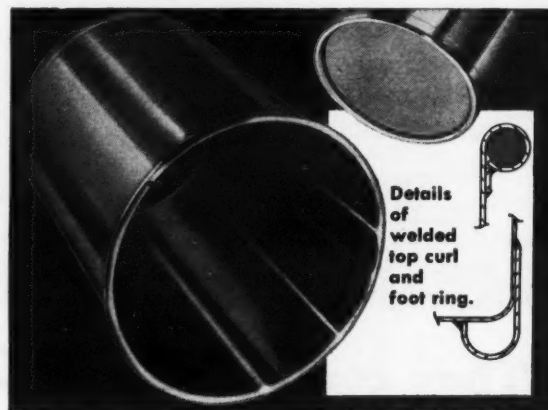
plants, lumber kilns, foundries, chemical plants, sewage disposal plants, laundries, heat exchangers . . . many others.

Markal "D-A" Coatings are applied by brush or spray and can be air dried or baked. The Coatings will withstand temperatures up to 600°F.

For free sample write on company letterhead, stating temperature extremes, surface temperature at time of application, and corrosive condition.

Other Markal Coatings are available in a complete range of types for any condition and temperatures up to 2200°F. Send for catalog No. MPC. The **Markal Company**, 3055 West Carroll Avenue, Chicago 12, Illinois, telephone Sacramento 2-6085

Check 3738 opposite last page



Hackney Stainless Steel Crevice-Free Chemical Containers

- Meet local, federal maximum sanitary regulations
- Welded foot ring curl and top curl crevices
- Seamless type construction
- Made to resist years of hard service
- 30-, 55-gal. sizes—8 models; 2 types of covers available
- Plain and soldered-crevice models for less critical service

Send for complete details. Write:



Pressed Steel Tank Company

Manufacturer of Hackney Products

1463 S. 66th Street, Milwaukee 14, Wisconsin
Branch offices in principal cities

CONTAINERS AND PRESSURE VESSELS FOR GASES, LIQUIDS AND SOLIDS

Check 3975 opposite last page

CHEMICAL PROCESSING

B.F. Goodrich Chemical raw materials

ing fluid at end of operation, that they would no longer float. Fluid would have to be transported to a regulated disposal area before drilling barge could move to next location.

Developed by Gulf Oil Corporation, the mud reclamation barge consists of a 110 x 30 x 7-ft cargo barge equipped with the following major pieces of equipment: A 750- and 250-bbl capacity storage tank, three 7½-hp stirrers, a 500-gpm screw-type rotary pump, hydraulically-powered decanting-type centrifuge, 40-kw generator set, 2-hp light plant, and a 2-hp centrifugal pump for water.

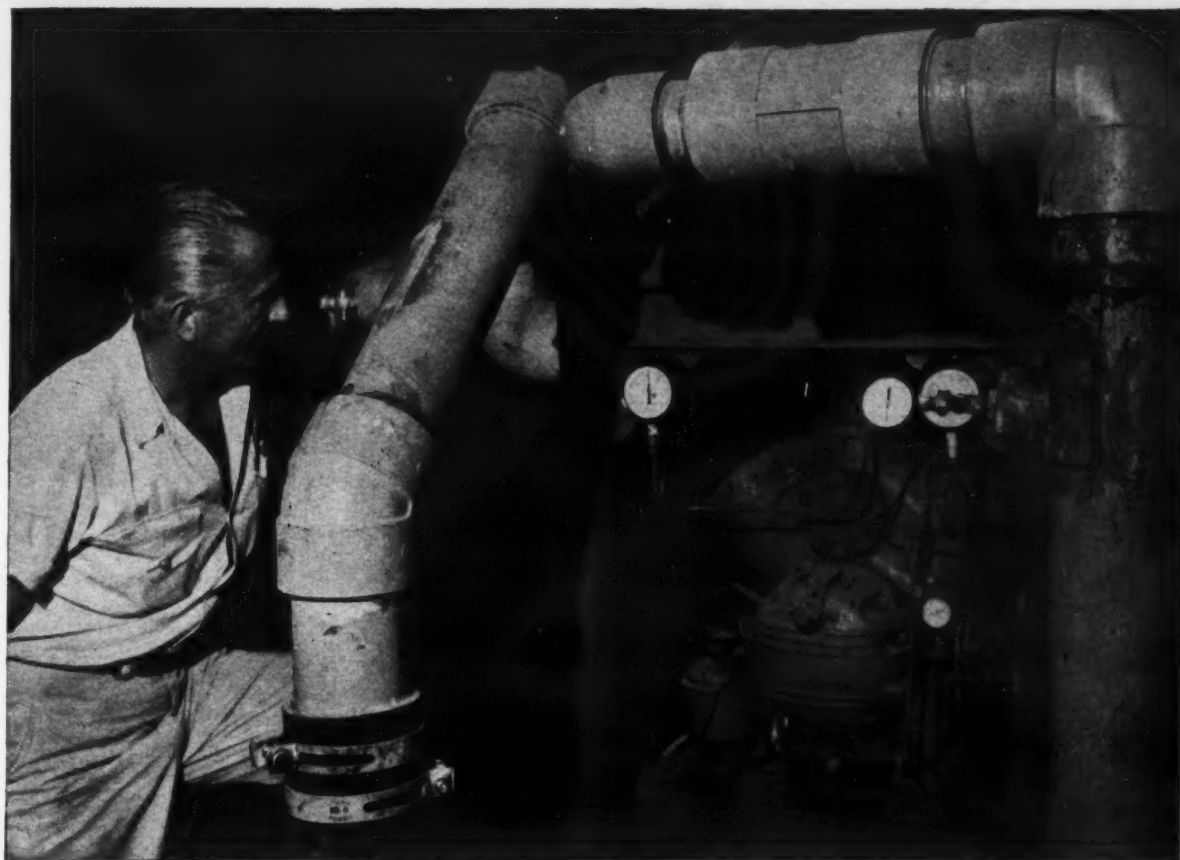
Pump Can Handle Walnut Shells

One of the most important units on the barge is a big single-screw type pump.* Powered by a 50-hp diesel engine through a 3:1 reduction gear, unit can handle large sized granular particles, such as ground walnut shells, at rate of 450 gpm at 600 rpm and 150 psi pressure.

In addition to serving as a mud transfer pump, unit is used to seal off porous or fractured formations in wells. These are often encountered during drilling operations and must be plugged to prevent loss of drilling fluid to the formations. In such cases, pump moves concentrated slug of walnut shell and mud slurry down drill pipe to seal off zones of loss circulation.

Purpose of centrifuge is to separate barites from low-density drilled formation solids in liquid mud slurries. The barites are recovered for re-use while the low density formation solids are discarded.

In normal operation, barge is spotted near the mud tanks of drilling rig. Volume of mud, usually 100 bbl, is pumped from active mud system on



the pipe is made of Geon
handles salt water under pressure: no corrosion

NO pipe replacement problem will plague the owners of this Florida air conditioning installation. If ordinary pipe had been used, the corrosive effect of salt water under pressure would soon show up in high replacement costs. But pipe made from Geon rigid vinyl handles the job easily—and permanently. It is not affected by salt water. No galvanic corrosion problem either.

Geon vinyl pipe more than pays its

way wherever corrosion is the problem. Installation crews like it, too, because it is lightweight and easy to handle. Can be readily joined by solvent welding.

How can you take advantage of pipe made from Geon rigid vinyl? Get information by writing Dept. LJ-2, B.F. Goodrich Chemical Company, 3135 Euclid Avenue, Cleveland 15, Ohio. Cable address: Goodchemco. In Canada: Kitchener, Ontario.



B.F. Goodrich Chemical Company
a division of The B.F. Goodrich Company



GEON polyvinyl materials • HYCAR American rubber and latex
GOOD-RITE chemicals and plasticizers • HARMON colors

*The pump referred to by Mr. Jeffus is a Moyno screw-type rotary pump and is a product of Moyno Pump Division, Robbins & Myers, Inc., 1345 Lagonda Avenue, Springfield 99, Ohio.

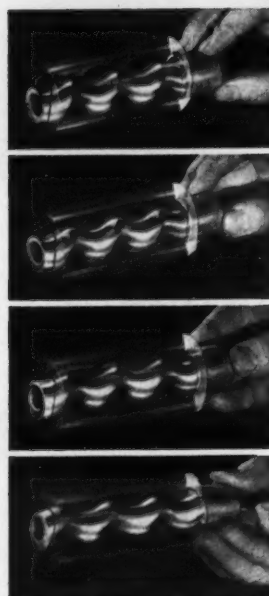
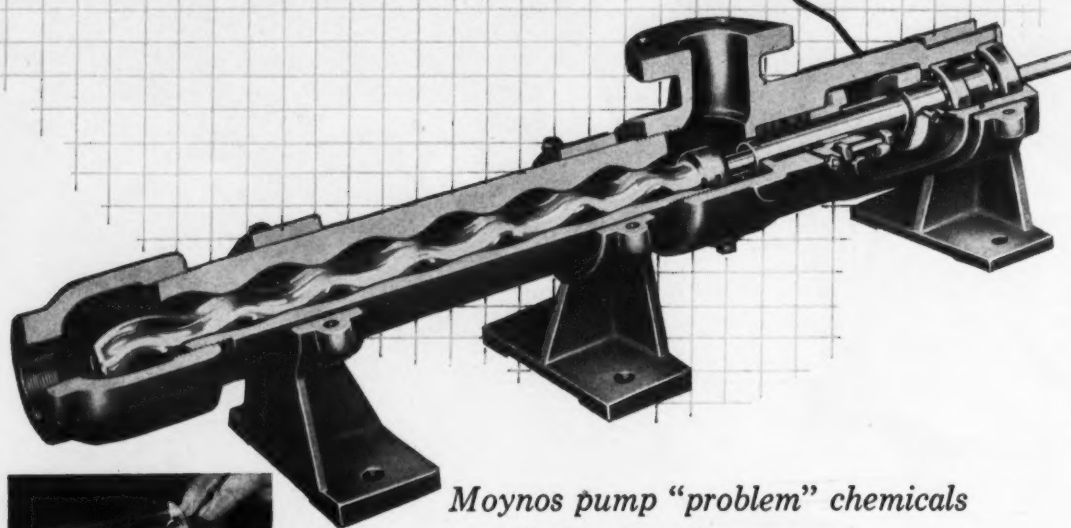
Check 3739 opposite last page.

Check 3740 opposite last page

MOYNOS[®]

SLASH PUMP

MAINTENANCE COSTS



PROGRESSING CAVITY PRINCIPLE
A screw-like rotor revolves in a double threaded helical stator creating smoothly moving cavities.

*Moynos pump "problem" chemicals
that ruin other pumps!*

Moyno Pumps have increased production and greatly lowered downtime on many chemical jobs where they replaced other type pumps which had run up prohibitive maintenance costs or failed completely.

Moynos can pump any chemical that can be forced through a pipe, whether a thin watery slurry or an extremely viscous material like rubber dough. A rugged screw-like rotor turning inside a double threaded stator forms "progressing cavities" which move chemicals smoothly. Fluids are pumped without turbulence or agitation. Discharge is uniform, nonpulsating.

Moynos last longer on tough chemical duty because the rotor and stator can be made of special materials that resist the tortures of abrasion and corrosion. Moynos need few or no repair parts . . . show little wear, even after long service.

If you are moving chemicals by hand or other expensive means because they're considered "unpumpable" . . . or if you want to decrease present pumping costs on "problem" chemicals, send us an outline of your problem today. Write for your free Moyno Pump Bulletin 30-CP.



ROBBINS & MYERS, INC.

SPRINGFIELD, OHIO

BRANTFORD, ONTARIO



MOTORS



FANS



HOISTS



MOYNO PUMPS



PROPELLER FANS

Check 3741 opposite last page

IDEAS

rig to small storage tank on barge. This serves as medium to receive and dilute barite sludge coming from centrifuge to desired density before pumping back to active mud system.

A 2-in rubber suction hose is connected between active mud tank and a second small screw-type rotary pump on barge. Mud is picked up from active mud pit and transferred to centrifuge. Before mud reaches unit, it is diluted with water, whereby a more efficient separation can be effected in centrifuge.

Barite sludge from centrifuge drops into 250-bbl storage tank and is further diluted with water until desired density is reached. A third screw-type pump moves treated slurry from tank on barge to drilling rig's mud system for reuse.

Effluent from centrifuge, containing undesirable low density formation solids, water, chemicals, and oils, flows by gravity to receiving tank on rig. Effluent is later sent to a regulated disposal area.

Surplus Mud Also Processed

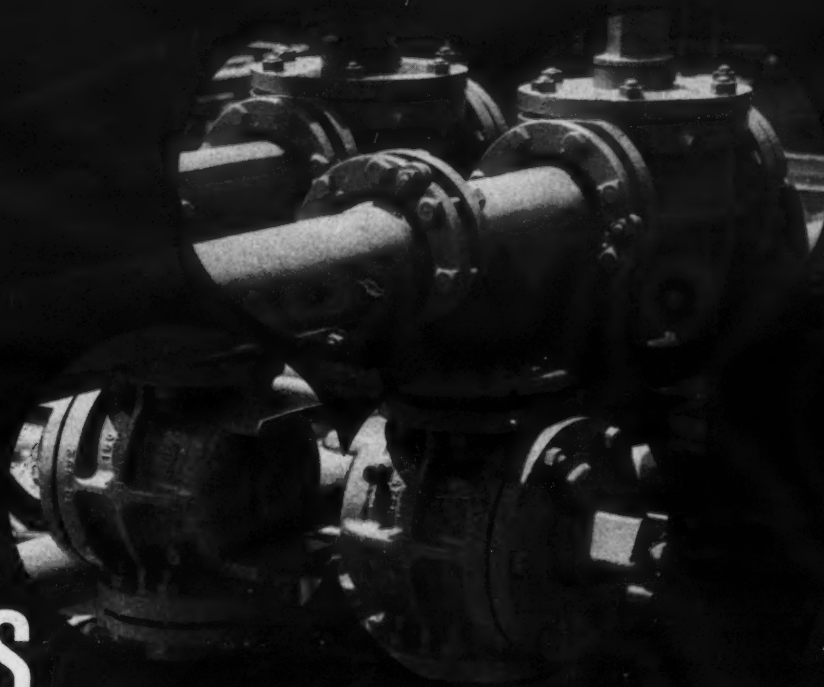
Surplus drilling mud from 750 bbl tank can be treated in same manner. This becomes an important feature when a well has experienced loss of circulation. Barge can be towed to other rigs operating in the field and take on any excess volume of mud they might have. Surplus mud is treated by centrifuge if necessary, and delivered to rig needing mud. This by-passes need for making up fresh volumes of drilling fluid to combat loss circulation.

(Based on paper prepared by D. M. Jeffus, Jr., Gulf Oil Corporation, Houston 1, Tex.)

NEXT MONTH

First installation in the brewery industry of a recently developed horizontal pressure-leaf filter — which saves plant valuable time through its automatic cleaning feature — is given on-the-spot coverage in a New Solutions highlight.

IN THE SPOTS THAT COUNT...



Goodyear specifies Homestead Valves for non-contamination of GR-S latex rubber

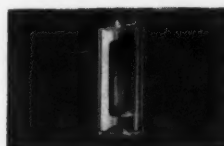
Through the round ports of Homestead Lubricated Plug Valves at Goodyear Tire and Rubber Company's synthetic rubber plant in Houston, Texas, flow dilute solutions of GR-S latex rubber at 80 p.s.i. and 100° F.

Fluid solutions never lodge and build up in the line since Homestead Round Port Valves provide full circular opening through plug and body of the valve—same size as the pipe they serve.

A letter or the coupon below will bring you further information on this installation. You may also receive complete details on low first cost, low maintenance, Homestead Valves in our catalog 39-1.



HOMESTEAD VALVE MANUFACTURING COMPANY
P. O. Box 140, Coraopolis, Pennsylvania



Controlled pressurized lubrication plus extremely close tolerances between plug and body assure lubrication of all sealing surfaces without contamination of line fluids.

- ☐ Please send me catalog and prices on Homestead Lubricated Plug Valves.
- ☐ Send more facts about latex applications.

Name.....Title.....

Company.....

Address.....

City.....Zone.....State.....

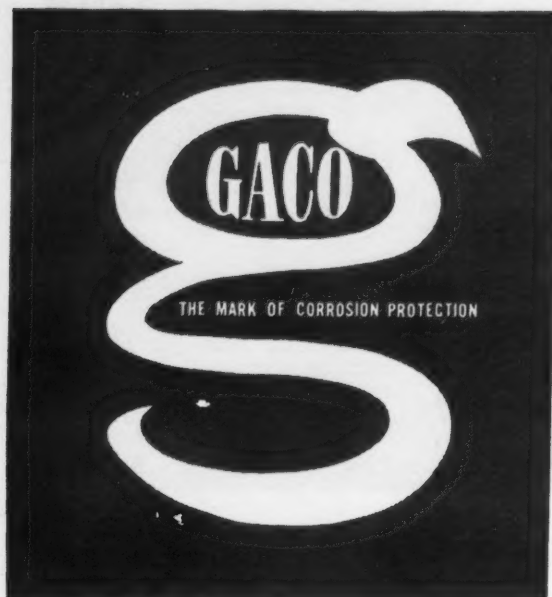
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NEW

GACO H-1 and H-2

Hypalon maintenance coatings and liquid linings

Bright fast colors, air cure, high tensile, and greater hiding power feature GACO formulations of Hypalon, the new duPont synthetic rubber with superior corrosion resistance. GACO Hypalon coatings are unaffected by ozone, have unusual weather and abrasion resistance, and are suitable for continued use at elevated temperature. Wide choice of color with no sacrifice in other physical properties open new areas of application for GACO Hypalon coatings. Write for details.



FOR HEAVY-DUTY CORROSION SERVICE THE GACO CORROSION PROTECTION SYSTEM

Challenge: When paint or ordinary corrosion protection products won't do the job, specify GACO. A complete line: Neoprene, Natural Rubber, Vinyls, Liquids, Sheet, Putties . . . performance-proven in applications throughout the world. *And A Complete Service.* There's a GACO Corrosion Specialist in your area prepared to serve your needs. Write for further information—we'll forward case studies of interest.



THE MARK OF CORROSION PROTECTION

GATES ENGINEERING COMPANY

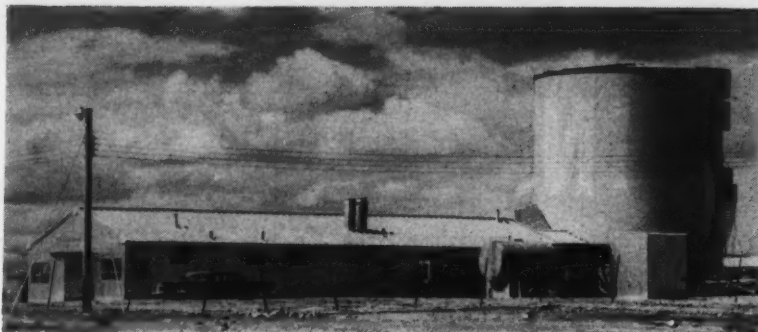
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LTD., BRANTFORD, ONTARIO.

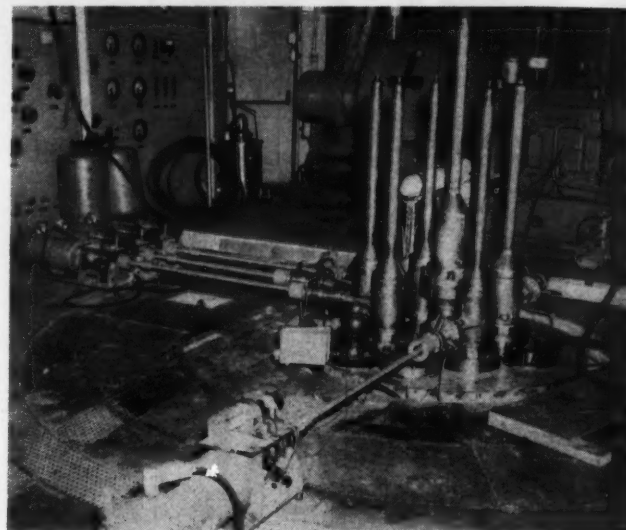
Check 3743 opposite last page

IDEAS



View of ALPR at National Reactor Testing Station in Idaho. Reactor is housed in steel tank at right

Control rod drives and motors, shown with shielding removed



Designed for quick delivery and easy assembly at remote locations, AEC conducts shakedown tests on . . .

Air-transportable nuclear power plant

Latest packaged military reactor incorporates many advance features, can produce 200 kw electricity, 400 kw of space heating

Another packaged nuclear power plant has joined the ranks of the military. Although smaller than the Army's APPR — Army Package Power Reactor (see CHEMICAL PROCESSING, July 1957, pages 139-141) — at Ft. Belvoir, Va., its mission is the same: to provide power to installations located in remote or relatively inaccessible areas.

Designated as the Argonne Low Power Reactor (ALPR), unit is designed to produce 200 kw of electricity and 400 kw of space heat. The power could be used to

operate radar equipment. The heat would warm offices, barracks, and other buildings. All components can be easily transported by air.

The prototype plant is located at the AEC National Reactor Testing Station in Idaho where it currently is undergoing an extensive testing program. It is also being used to train military personnel who will operate future package power plants of this type. Official dedication took place on December 2, 1958. Overall cost of project was about \$1,986,000.

Since future models will be installed in remote areas, no vapor-tight containment shell around reactor was deemed necessary. Unit is housed in a circular continuous-welded steel tank measuring 38½' diam and standing about 50' above grade. Reactor vessel rests within a lead-shielded support cylinder. Both are surrounded by ordinary gravel, which forms main biological shield. The entire support cylinder and vessel stand on structural steel at bottom of reactor building tank.

Top of gravel is coated with a non-permeable emulsified tar to restrict leakage of radioactive dust or gas. Below reactor, a sheet of metal containing boron helps prevent activation of air in gravel voids by capturing and absorbing thermal neutrons coming through reactor tank.

Operates at 300 psi, 420°F

The ALPR is a direct-cycle boiling water reactor of 3000-kw gross reactor heat, with enriched uranium fuel, and moderated and cooled by natural circulation of ordinary water. Unit operates at 300 psi and 420°F. About 85% of steam is used to generate power. The other 15% bypasses turbine and is used for space heating.

Reactor vessel is ¾"-thick steel, clad with 3/16" type-304 stainless. Unit is about 15' high and has 4½' OD. Core consists of 40 aluminum-uranium alloy fuel assemblies and five control rods fitted into a support-and-shroud structure. Fuel assemblies are expected to have three-year operating life. Only five lb of fuel will be consumed during that time, corresponding to about 1.5 million gal of fuel oil.

New Alloy Used

A new aluminum-nickel alloy, called X-8001, was used as the main fabricating metal for the core and fuel element cladding. Developed by Argonne National Laboratory, the alloy is composed of small amounts of nickel added to aluminum 1100, a commercial



New—Goulds Fig. 3604—a ½" pump for chemical circulating and transfer service.

Here's a small pump with big-pump stamina Ideally suited for handling corrosive materials

Small, compact—this new pump fits in where space is a problem. But you can rely on it for continuous service round the clock, round the calendar.

It's available from stock in 316 Stainless Steel—which provides the widest and most economical coverage of liquids commonly handled by a pump of this type.

The mechanical seal—with carbon, Teflon, stainless steel and ceramic parts—is noncorrosive.

The impeller clearance is externally adjustable to compensate for wear.

The pump is small enough (10½ x 5½ x 5½) and light

enough (23 lbs. with motor) for lab or pilot plant operations. It's designed for temperatures to 220° F. and working pressures to 75 p.s.i. Capacities to 16 GPM and heads to 28 ft.

For circulating duty, as a component in larger equipment, this new Goulds chemical pump offers advantages in size, weight, cost, and dependable performance.

Complete information on this high-quality pump—performance curves and specifications—is offered in Bulletin 624A4. You can get a copy from your Goulds representative, or by writing us.

GOULDS
PUMPS FOR
CORROSIVES

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Have You a Special Heat Transfer or Chiller Problem?



Has the answer in its
Scraped Surface Exchangers

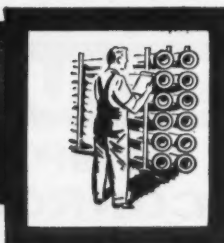
Send for Bulletin PE-1 today.
Address Dept. 24A-RICP

OTHER VOGT PRODUCTS: Drop Forged Steel Valves, Fittings and Flanges in a complete range of sizes • Petroleum Refinery and Chemical Plant Equipment • Steam Generators • Heat Exchangers • Ice Making and Refrigerating Equipment.



HENRY VOGT MACHINE CO., P. O. BOX 1918, LOUISVILLE 1, KY.

SALES OFFICES: New York, Chicago, Cleveland, Dallas, Philadelphia,
St. Louis, Charleston, W. Va., Cincinnati



Check 3745 opposite last page

IDEAS

alloy that contains iron. The new alloy is expected to have great resistance to corrosion at high temperatures and pressures. Its use should also cut power costs because the metal is more economical to fabricate and process.

Control rods are made of cadmium and clad with X-8001. The alloy gives extra wear resistance and structural rigidity to the rods.

Steam condenser for ALPR is cooled with air instead of water used in conventional plants. This minimizes water requirements for the installation. Condensers are constructed completely of aluminum. Air is circulated over the finned condenser tubes by a 90" fluid-drive, 75-hp fan delivering an estimated 93,000 cfm.

Simple and reliable operation and maintenance, with minimum supervision, has been the goal throughout the design of ALPR. Standard components have been used wherever possible. No single component weighs more than 20,000 lb, or is more than 20 x 7 x 9' in size.

The unit is essentially an extension of the design and operating experience gained from earlier series of Argonne boiling water experiments (BORAX program).

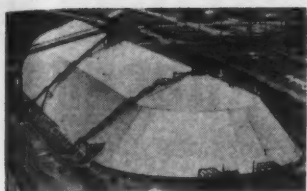
(ALPR was designed and engineered by Argonne National Laboratory, operated for U.S. Atomic Energy Commission by The University of Chicago, Lemont, Illinois.)

(Further information about aluminum air-cooled condensers may be obtained from Modine Manufacturing Co., Racine, Wisconsin.)

Check 3746 opposite last page.

**Giant storage building
is corrosion-proof,
never needs paint**

Benefits that can be achieved through use of aluminum siding and roofing are being demonstrated on one of the largest raw material storage buildings in the country. Located at Gramercy, Louisiana, the giant structure is capable



Huge structure houses up to 132,000 long wet tons of bauxite

of storing up to 132,000 long wet tons of bauxite ore.

A clear-span, tepee-type structure 783 ft long, 204 ft wide, and 83 ft high, the building is covered with 235,000 sq ft of corrugated aluminum box ribbed siding and roofing sheet. Building has semi-circular ends and sloped sides and roof to conform to shape of storage pile.

Main structural frames each consist of three hinged arches of built-up plate girders, 204 ft in span and spaced 25 ft on center. Weight of structure per sq ft of building is about 13.5 lb.

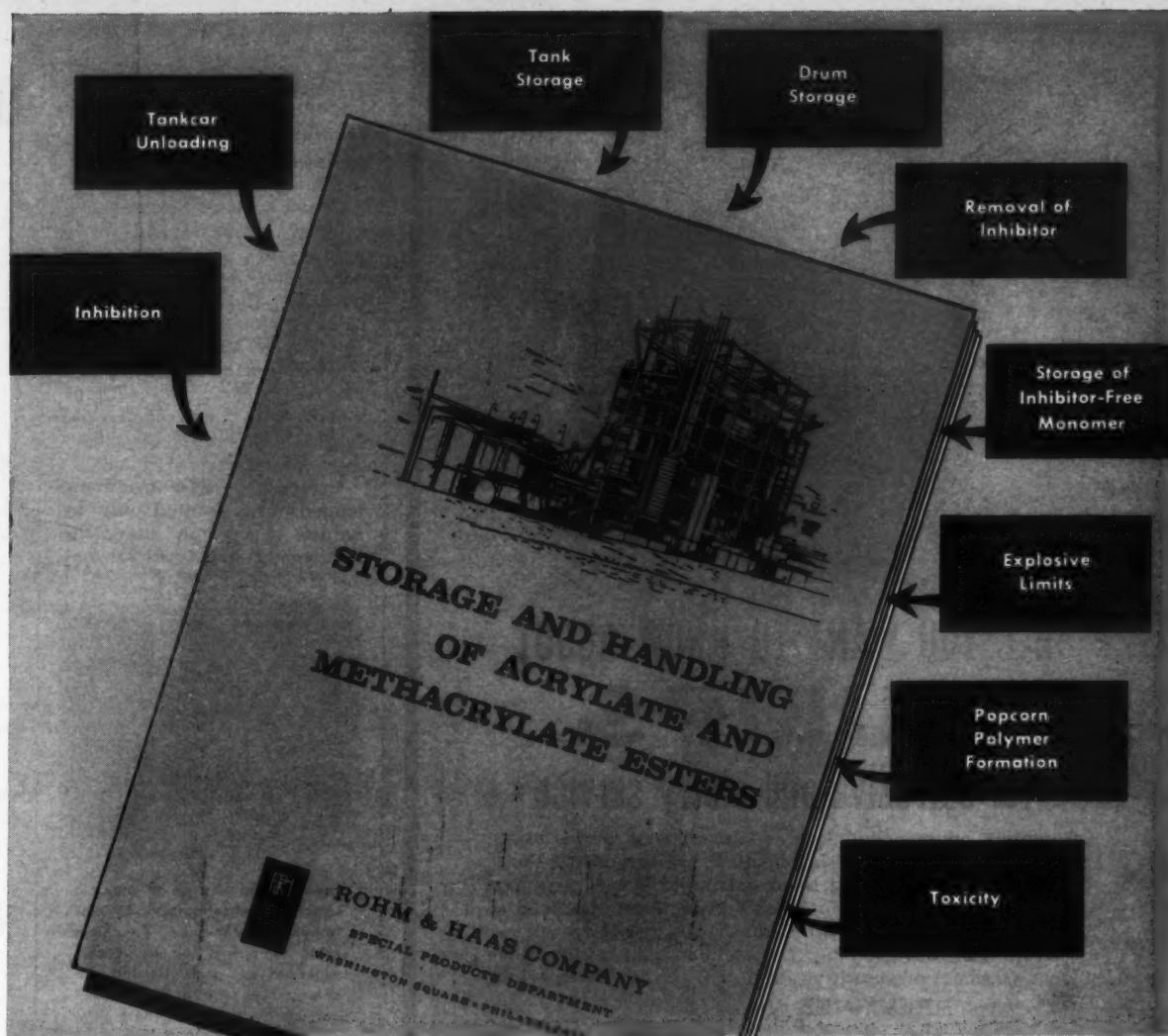
Roofing and siding sheet is 0.032 gage with rib configuration 1½ inch deep, 5.33 inch pitch, and 2.125 inch top and bottom flats. Sheet had stucco embossed finish and weighs about 63 lb per 100 sq ft.

Metal was attached to purlins and struts spaced 7 ft, 3 inches on center with 1¼ inch long, stainless steel, screws with neoprene washers. Three-quarter inch screws were used for side laps. Side laps of both roofing and siding were laid with one corrugation lapped in opposite direction of prevailing wind. End laps for siding were 4 to 6 inches for roofing with fastening directly to purlins.

Building is resistant to corrosion and never requires painting. Initial cost was comparatively low because of elimination of light trusswork and laced members from structural frame. Stiffeners on main members were also reduced to minimum.

(Further information about use of aluminum in buildings can be obtained from Kaiser Aluminum & Chemical Corporation, 1924 Broadway, Oakland 12, California.)

Check 3747 opposite last page.



Complete Engineering Service on Acrylic Monomers

Copolymerization with acrylic monomers offers a variety of advantages to producers of polymers based on such monomers as vinyl chloride, vinyl acetate, vinylidene chloride, acrylonitrile or styrene. For example, internal plasticization, improved heat and light stability, faster polymerization rate and better adhesion.

When you choose Rohm & Haas as your supplier of acrylic monomers, engineering services are part of the "package". Among these is the booklet illustrated above, offering important technical information on

storage and handling of acrylic monomers, based on Rohm & Haas' long commercial experience. Write to Dept. SP-1 for your free copy.



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Check 3748 opposite last page



ALL YOU WANT TO KNOW ABOUT PUMPS for corrosive and slurry service

Complete engineering data — dimensions, performance curves, parts lists and specifications on the entire Dorr-Oliver line of alloy metal, lined and diaphragm-type pumps — all in one big bulletin! Here's everything you need to solve difficult pumping problems . . . just off the press!

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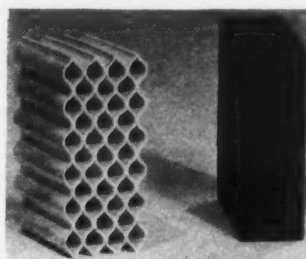
Check 3749 opposite last page

IDEAS

**Ceramics can be rolled,
formed into corrugated,
honeycomb shapes**

Ceramic heat exchangers, catalyst supports, and other lightweight structural units may soon be commercially available, thanks to new ceramic forming technique developed by Minnesota Mining & Manufacturing Company. Process permits any ceramic material to be rolled and formed into intricate shapes and structures.

Capable of withstanding temperatures limited only by nature of ceramic used, the lightweight structures are ex-



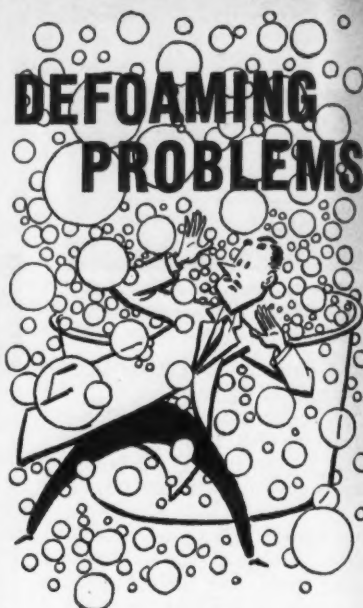
Examples of types of ceramic structures made possible by new forming technique. Zirconium oxide sample at left has 3 corrugations per inch. Bonded silicon carbide unit at right has 7 corrugations per inch. Both samples are 2 inches high

pected to find important use in chemical, nuclear, and missile fields. Corrugated, honeycombed, and other high surface area structures when used in heat exchangers or other processing equipment, may open up new applications held back until now by corrosion and temperature limitations. This could result in new or more economic chemical processes.

Details for the new technique have not been revealed, but it is known that a ductile ceramic is used at beginning of process. In their final form, the ceramics are no longer ductile.

(Further information about ceramic structures may be obtained from Minnesota Mining & Manufacturing Co., St. Paul, Minnesota.)

Check 3750 opposite last page.



**solved with the
MULTIWHISTLE
Air Jet Generator**



- no maintenance
- no contamination
- no product loss
- no additives

Ultrasonic sound waves! Just sound waves and radiation pressure which together collapse bubbles in seconds.

That's how the Multiwhistle works. No muss — no fuss, no additives to put in or get out. You make full use of equipment capacity, keep foaming to any predetermined level, save on time, labor, and equipment.

And you save on maintenance — there are no moving parts, no electronics. All you need to operate it is a moderate air or gas pressure supply — from 40 to 70 psi.

Find out how little it costs to install a Multiwhistle. Get full information on this new economical approach to perfect defoaming. Write today for Bulletin RB-12.

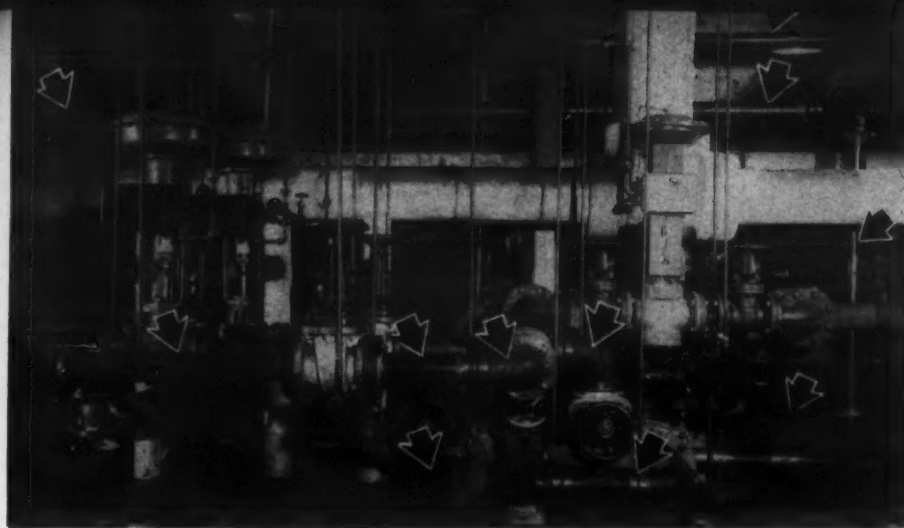
VIBRO-CERAMICS DIVISION



**Gulton
Industries,
Inc.**
Metuchen,
New Jersey

Check 3751 opposite last page

CHEMICAL PROCESSING



Helping in the manufacture of recently developed tough, wear-resistant Tyrex* viscose tire cord, 18,806 feet of —

REINFORCED EPOXY RESIN PIPE RESISTS CORROSIVES ABOVE 150°F

GORDON WEYERMULLER
Associate Editor

At the Painesville, Ohio, plant of Industrial Rayon where Tyrex* viscose tire cord produced, epoxy resin pipe reinforced with glass fibers is playing an outstanding role. Pipe has been found to provide excellent resistance to both acid and caustic at moderately high temperatures. It has been used extensively in the plant.

Spin Room

First trial installation of the reinforced pipe at the plant, placed in service in the spring of 1958, was in the spin room. Here the fixative — consisting of sulfuric acid at a temperature above 150°F — passes to the spin heads and is distributed to each spin reel. Pipe was found to well withstand the corro-

sive acid at this temperature. Another advantage found for the pipe is the low k factor, which eliminated the need for insulating the supply lines. Heat transfer rate is about .87 Btu/hr/sq ft/°F/inch. Ease of fabricating is another favorable factor shown for pipe on this initial trial.

Original installation proved so satisfactory that in May 1958, conversion of the entire battery of spin machines was begun, using the reinforced plastic pipe. It replaced metal



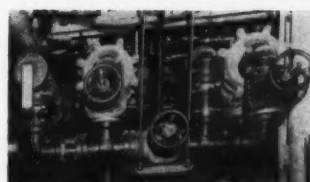
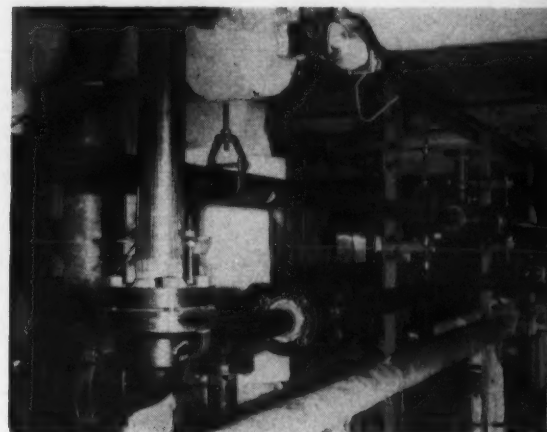
Industrial Rayon has complete area set aside for cutting and fitting the pipe. Joints are glued, then heated and dried until set

*Tyrex is a certification mark of Tyrex Inc. for viscose tire yarn and cord.

cp CORROSION
CONTROL

Arrows indicate reinforced epoxy resin pipe on second level at Industrial Rayon. Piping handles sulfuric acid, which is filtered after coming from vats below

Epoxy pipe and fittings in another area. Glass fiber reinforcement is visible on vertical section in foreground



Reinforced epoxy resin fittings on lower level

pipe and lined pipe, which had not been as satisfactory.

Viscose Lines

After several of the spin machines equipped with the Fibercast pipe were functioning properly, plant decided to try it on viscose supply lines to replace corrosion-resistant alloy piping. For this application, the pipe handles a cellulose solution containing sodium hydroxide. Pipe has proved to be quite satisfactory for this service.

Plant has a complete area set aside for cutting and fitting the pipe. To date 18,806' of the pipe and 7881 fittings have been installed in the plant.

Pipe is made by bringing woven glass fibers and epoxy resin together in a high-speed centrifugal casting machine. It is produced in lengths of about 20', with or without threads. Pipe up to 3½" OD is made with multiple layers of seamless braid. Pipe 4½" OD is made with specially designed glass cloth in convolute layers.

Although the reinforced piping is subject to only moderate pressures at Industrial Rayon, it can withstand pressures as high as 1000 psi and temperatures to 300°F.

Pipe has a smooth interior with a Hazen-Williams C factor of 147. This minimizes friction losses, facilitating flow. Pipe is less than ¼ the weight of steel. It has essentially the same linear coefficient of expansion as steel. It is a non-conductor and is not subject to cold flow.

The tough Tyrex viscose tire cord, produced at the plant where the pipe is used, is one of the most recent developments in the synthetic fiber industry. Extensive mod-

**You Can
Prevent
These Three
Relief Valve
Problems
With a BS&B
Quik-Sert**

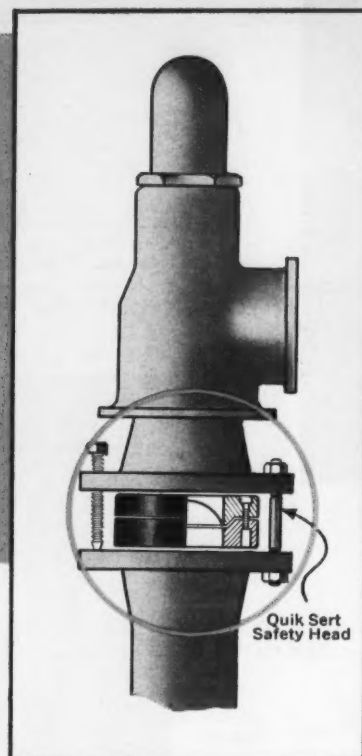
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BEFORE



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The BS&B Quik-Sert Safety Head isolates the relief valve from the product under pressure. Mounted under the valve inlet, it is "bottle tight" until overpressure reaches the rated pressure of the preformed metal rupture disc.

The Quik-Sert Safety Head flange assembly is located inside the bolting of companion flanges. Easy insertion and removal is accomplished through the use of jack screws.

A BS&B Quik-Sert Safety Head Under the Relief Valve Gives You These Advantages

- Stops product loss at normal operating pressures
- Assures proper valve function at set pressure
- Lowers maintenance costs
- Reduces shutdown time

BS&B engineers will be glad to evaluate your pressure system for proper applications of the Quik-Sert Safety Head.



Write, wire or phone...

**BLACK, SIVALLS &
BRYSON, INC.**

Safety Head Division, Dept. 2-M2
7500 East 12th Street, Kansas City 26, Missouri
Telephone: BEnton 1-7200

Check 3752 opposite last page

CORROSION CONTROL

ification in the viscose process and in plant equipment have enabled a yarn to be produced that is outstanding for tires.

In a field test presently being conducted on 150 cabs in New York City, superiority with respect to tread wear has been shown on tires made with Tyrex viscose cord. Other tests have shown that tires made with Tyrex viscose cord have high impact resistance and outstanding tread wear at high speeds.

(Fibercast reinforced epoxy pipe is product of Fibercast Company, Div. of Youngstown Sheet & Tube Co., PO Box 727, Sand Springs, Okla.)

Check 3753 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip

Contamination prevented with large stainless steel fittings

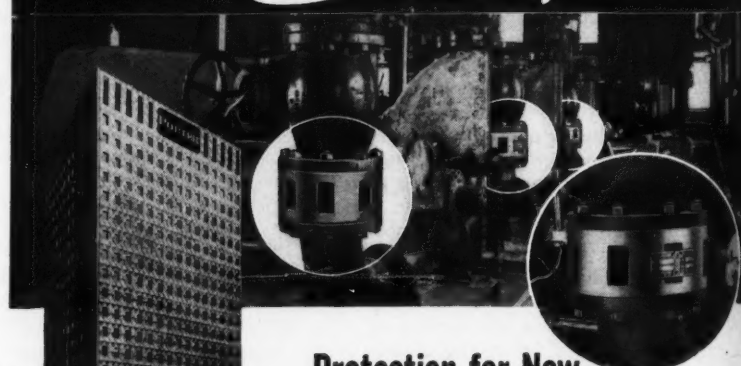
Transmit high-purity water at 575°F and 1000 psig

Problem: In the Dresden Nuclear Power Station being built for Commonwealth Edison Company 50 miles southwest of Chicago, absolute integrity of the primary reactor recirculating system is required. This is necessary to prevent escape of water containing radioactive particles which could contaminate the entire plant.

Uses High-purity Water

Reactor recirculating system will handle high-purity water at 575°F and 1000 psig. This is not severely corrosive to carbon steel and low-alloy steels. However, corrosion

Williams-Hager *Silent* CHECK VALVES



Protection for New 16-Story PORTER BUILDING

No effort has been spared in making Pittsburgh's newest building, headquarters for H. K. Porter Company, Inc., truly modern in every respect. In line with this policy, piping and pumps are protected by Silent Check Valves. These operate instantly when flow reversal starts or when flow is zero. Write for Bulletin 654

Architect: Harrison & Abramovitz
Consulting Engineers: Jaros, Baum & Bolles
General Contractor: George A. Fuller Co.
Plumbing Contractor: Sauer, Inc.
Heating & Ventilating Contractor: Limbach Co.

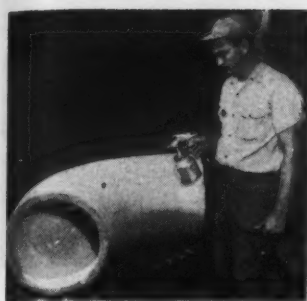
THE WILLIAMS GAUGE CO., INC.

146 Stanwix Street • 2 Gateway Center • Pittsburgh 22, Pa.
Our 73rd Year — 1886-1959

Check 3754 opposite last page

CHEMICAL PROCESSING

CORROSION CONTROL



Stainless steel fitting being checked with fluid penetrant to assure absence of flaws in recirculating system

product particles would be harmful to the system.

Solution: Reactor recirculating system is being fabricated of 304 stainless steel or carbon steel clad with 304. Forty-two large cast stainless steel fittings are being employed in the system, ranging from 10 to 22" in diameter.

Fittings were thoroughly tested with fluid penetrant and a radiographic procedure to assure absence of defects. They must meet applicable ASA and ASME codes.

Results: Procedure used to manufacture and inspect stainless steel fittings and other parts of reactor recirculating system give assurance of continuous operation without contamination difficulties.

(Key-Kast stainless fittings are product of W-K-M, division of ACF Industries, Inc., PO Box 2117, Houston 1, Texas.)

Check 3755 opposite last page.

(Erection and installation in the Dresden Nuclear Power Station is being performed by the Bechtel Corporation. This company is working as the engineer-constructor under a contract with General Electric Company.)

for the MOST IN DRYING BENEFITS

—Uniform Drying or Curing
—Economical Heating
—Economical Handling

ROCKWELL OVENS

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Cabinet, shelf and rack or truck loading type ovens available in 24 standard sizes.

W. S. ROCKWELL CO.

2209 Eliot St. • Fairfield, Conn.

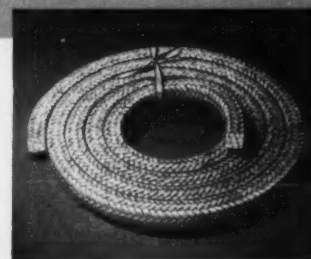
Check 3756 opposite last page

How will you have your TEFLON packing

BELMONT TEFLON* Packings—impervious to acids, caustics, oxidants, solvents, for long troublefree life in the most difficult service—are offered in a wide variety of forms to best suit each individual requirement. Select your needs from the *most complete line* and get *exactly* what you want. Your Belmont Packing Distributor is ready to serve you. Or write for Catalog T-57.

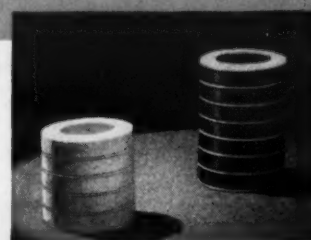
BRAIDED

Belmont braided Teflon yarn (No. 3085) and Teflon ribbon (No. 3055) are offered with the rugged mechanical structure of Belmont's unique CRISS-CROSS Braid that will not ravel, wear through, slough off. Each strand criss-crosses diagonally through the body of the packing, becoming an integral part of the whole. Supplied in coil, reel and ring form.



MOLDED

Belmont Pump Packing Rings, molded from shredded pure Teflon with Teflon suspensoid (No. 3062) and impregnated with graphite (No. 3061) serve the requirements for both non-contaminating and general purpose chemical pump service throughout the processing industries. Supplied in sets with solid Teflon spacers.



EXTRUDED

Belmont Extruded Teflon Packing (No. 3060-C) is shredded pure Teflon, impregnated with graphite and reinforced with a skeleton jacket of Teflon yarn. Available in reels and continuous lengths.

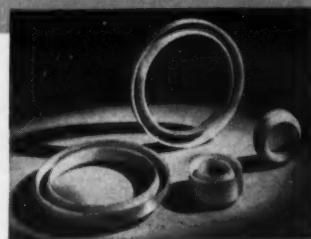
Belmont Bulk Packing (No. 3060-B) is shredded pure Teflon with graphite. Available in 1/2, 1 and 5-lb cans.



SOLID Rings

Belmont Solid Teflon Packings are offered in 3 designs—V-Rings (No. 3105), cup and cone (No. 3115) and wedge type (No. 3115-X). All provide a tight seal at low gland pressure and minimum friction on valve stem. Offered in sets, with square end adaptors where required.

*du Pont Trademark



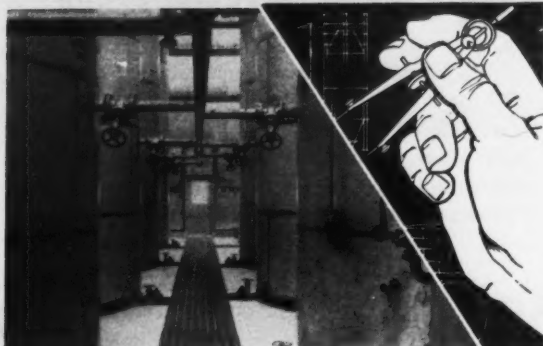
The Belmont Packing and Rubber Company • Butler & Sepviva Sts., Phila. 37, Pa.

BELMONT

Check 3757 opposite last page

from blueprint plans
PUGET SOUND FABRICATES

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Stainless formaldehyde storage tanks for Western chemical plant
...for the Chemical Processing Industry
on the West Coast.

You can save on transportation costs, manufacturing time and gain the dependability of over 58 years of custom fabricating experience when you call on Puget Sound as your West Coast source for process and plant equipment in steel plate and alloys up to 1". Send prints for prompt quotation on your next job.



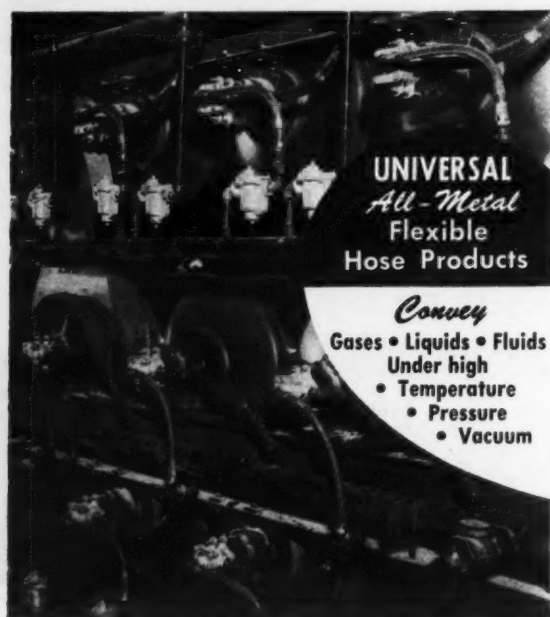
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All-Metal
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Convey
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Under high
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QUALITY...
All-Metal
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Check 3759 opposite last page

CORROSION CONTROL

**Ductile titanium tubing,
bent into hairpin form,
acts as heat exchanger**

Problem: Broken heat exchanger tubes threaten expensive chrome plating equipment and cause shutdowns at Van Der Horst Corporation of America, Olean, N. Y.

Additionally, synthetic piping sometimes becomes brittle and breaks easily. Fabricated corrosion-resistant metal tubing has been used, with lengths often joined by welding to obtain sufficiently long piece of tubing. But this has caused trouble because welded joints frequently break due to mechanical damage.

Solution: Ductile titanium tubing, bent in the form of a hairpin and immersed in 25% chromic-acid plating solution, is being used. Bent tubing acts as a heat exchanger.

Plating solution is heated or cooled right in tank by pumping steam or water through tubing, which is installed by connecting to water or steam pipes.

Results: One-inch outer diameter .020-inch wall, grade A-40 seamless titanium tubing costs a little over 1/6 as much as 0.13-inch wall metal tubing that has also been tried. Yet, it is just as inert to chromic acid as this other metal. Titanium has shown no evidence of attack by the acid in more than a year of service.

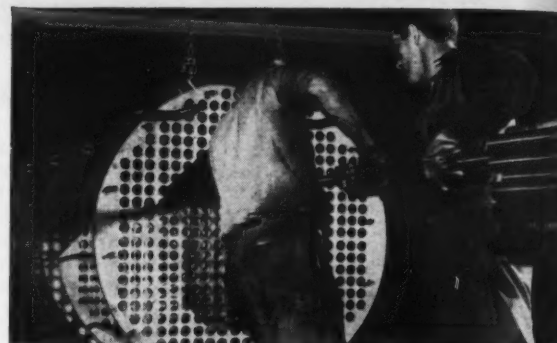
Long lengths of tubing — 15 ft minimum — make it possible to keep all joints above plating solution because integral pieces are sufficiently long to be bent into required overall length. Tubing itself reaches almost to bottom of tank.

(Titanium tubing is supplied by Superior Tube Company, 1938 Germantown Ave., Norristown, Pa.)

Check 3760 opposite last page.

Floor coatings, chemically resistant, are described in eight-page booklet. Resistant linings are also covered. Bul 2-958-10M — Ralph V. Rulon, Inc., 3900 N. 2nd St., Philadelphia 40, Pa.

Check 3761 opposite last page.



**Republic ELECTRUNITE Heat Exchanger
Tubes offer QUALITY you can measure**

CARBON STEELS • STAINLESS STEELS

Dependable . . . you bet! Republic ELECTRUNITE® Heat Exchanger Tubes are produced from highest quality flat-rolled steel, electrically welded by the exclusive ELECTRUNITE process that unites the tube under pressure without the addition of foreign metal. This process assures uniformity, strength, ductility, concentricity, and other physical properties to meet critical performance specifications. And, now you can specify FARROWTEST®, a production method of electronic testing, at no extra cost! Write for details.

REPUBLIC STEEL

STEEL AND TUBES DIVISION
207 East 131st Street • Cleveland 8 Ohio



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Conventional and 45° bevel type Puncups.

• The *right* piston packing for reciprocating pumps and cylinders goes a long way toward eliminating the problems of slippage, maintenance and down-time.

Because Darcova Puncups are made in a complete range of sizes, various types, and in many texture-engineered compositions, they *fit* your temperature-pressure-fluid conditions. That's one important reason why they usually outlast other packing at least 3 to 1 while holding top efficiency to the last!

Why not get *all* the facts? Send today for Bulletin No. 5503.



DARLING VALVE & MANUFACTURING CO.
Williamsport 4, Pa.

TRADE MARK

Puncups

Check 3763 opposite last page

CHEMICAL PROCESSING

THAT'S
INTERESTING

**Don't hike,
bike**

Instead of hiking around the 200 acres of Union Carbide Chemical's plant at Institute, W. Va., supervisory people use bicycles. Messengers and small repair parts are also biked to outlying plant sections. Besides being economical and quick, biking provides personnel with some good healthy exercise — helps supervisors win battle of bulge.

Cargo ships underwater

This is not fantasy according to David Brown, President of the Bureau of Ships. Future shipping operations will be conducted in underwater cargo vessels of 100,000 deadweight tons traveling at a speed of 60 knots. Recent developments in nuclear power have removed a major obstacle in the path of this cargo sub development.

For more information on product at right, specify 3764 see information request blank opposite last page.



ECO

ENGINEERING

NEWS

the big name in small pumps for the process industries

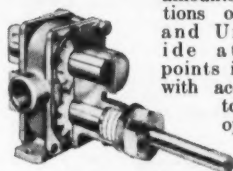
Pumping Notes

**Centrifugal Designed as Basic Unit in
Multi-plant Standardization Program**

ECO's CENTRI-CHEM[®] was designed to include all the most desirable operating and maintenance features in a centrifugal pump for general chemical service—and mass-produced at a price, making it profitable for any processing plant to standardize upon it. Type 20 Stainless Steel was selected for the ultimate in corrosion resistance and strength. The mechanical seal is chemically inert, non-contaminating TEFLON[®], ceramic or carbon. A removable face plate gives access to all internal parts without disturbing piping. Available, motor or pedestal mounted. Capacity to 40 gpm, heads to 50 ft. Priced as low as \$184.00 less motor.

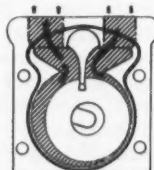
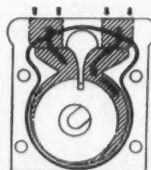
Purifying Uranium

ECO's GEARCHEM[®] Pumps, providing constant-flow metering with reproducible accuracy within plus or minus one per cent, are employed in a new system for purifying crude Uranium. Several units are already in use here and abroad. These Hastelloy[®] C pumps, with glass-filled TEFLON gears and bearings, meter exact amounts and concentrations of Hydrochloric and Uranyl Chloride at different points in the system, with accuracy essential to its successful operation.



Pumping Shear-Sensitive Fluids and Missile Grade Propellants

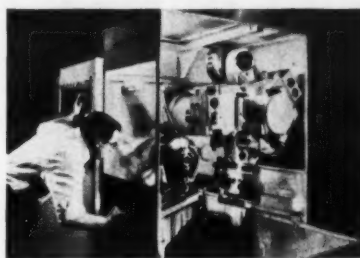
For pumping without mechanically disrupting fluid balance—ECO's ALL-CHEM[®] rotary displacement pump with its non-shearing, smooth, positive thrust of two axially opposed oscillating impellers producing two overlapping discharge and suction strokes per revolution, provides an almost pulseless flow essential to safe pumping of such media as hydrogen peroxide, hydrazine, nitroglycerine, etc. Also, in handling such fluids as missile grade propellants, subject to internal spark and explosive wave propagation, these pumps are widely preferred, since their self-lubricating TEFLON impellers and bearings eliminate internal spark hazard.



The Responsibility of Leadership

How ECO Builds Better Chemical Pumps at Lower Costs

Eco Engineering Company's position of leadership in the small chemical pump field is primarily the result of advanced engineering and an open mind to the new and improved materials of construction which have revolutionized design possibilities and service expectations. In this connection Eco has pooled the vast materials engineering research of such companies as du Pont, International Nickel, Carpenter Steel, Union Carbide, U. S. Graphite, Carborundum and other outstanding suppliers with their own broad pump manufacturing and application experience to produce their unique and diversified line of rotary, gear and centrifugal pumps for corrosive service.

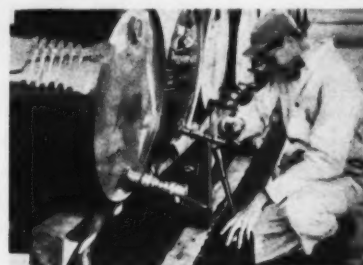


Automatic "Program" Machining

But building better chemical pumps was not sufficient. Eco insisted their line be lower in first cost as well as in upkeep than pumps of comparable quality. Mass production on the most modern automatic "program" machine tools, where multiple operations are performed to reduce needless labor and handling, was their answer to this requirement.

Standardization and Interchangeability

All Eco pumps were designed for precision manufacture with standardization of every component part for interchangeability in original assembly or replacement in the field. Interchangeability of parts and mass production has had another important value to the user. It has permitted manufacture and stocking of a highly flexible inventory to provide immediate delivery of any "specification pump" in the Eco line, as well as a variety of specification variations to meet individual customer needs.



Factory Mutual Approved Chemical Faucet

This Eco Stainless Steel Chemical Faucet is the ultimate for safely dispensing flammable and corrosive fluids. It is the only fume-tight, spring-loaded faucet with TEFLON seals which overcome seizure problems. Ideal for drum dispensing or for standard piping systems. Illustration shows solvent storage area at Eastman Kodak, Rochester plant, where more than 200 Eco Faucets are in use.

TEFLON T-Film[®] Hydraulic Sealant



Eco's chemically-inert thread sealant and anti-seize compound for metal, plastic, carbon and ceramic systems and equipment was produced originally as an aid to Eco pump users in the nuclear and corrosive chemical fields. After four years of highly successful use, T-Film is now in general use throughout the process industries wherever corrosives are encountered.

ECO Products for Handling Corrosive and Hazardous Processing Fluids

**ALL-CHEM Rotary Pumps
MINILAB Rotary Pumps
GEARCHEM Gear Pumps**

**CENTRI-CHEM Centrifugal Pumps
PUMPMOBILE Portable Pumping Units
CHEMICAL FAUCETS Factory Mutual Approved**

Ask for literature on any or all of these ECO Products

ECO Trademarks. du Pont Trademark. Union Carbide Trademark.

ECO ENGINEERING COMPANY • 12 New York Avenue • NEWARK 1, N.J.

Life in these excited states...

"I got the pot and tubing
corrosion licked, but
now the jugs won't hold up!"



"WAM" PUMP Hood you can buy



Highest pumping efficiency, with faultless corrosion resistance. Hard rubber casing and impeller; Hastelloy C shaft. 80 gpm. *Bul. CE-35.*

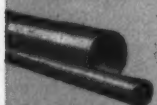
THRIFTY-THROATED VALVES



Liquids never touch metal in Ace diaphragm valves! Rubber or plastic-lined cast iron, or solid plastic bodies. Sizes 1/2 to 6". Ask for facts.

ACE-ITE

all-purpose toughness



High-impact, rubber-plastic, most economical for average chemicals. 1/2 to 6". Screw or solvent welded fittings. Valves 1/2 to 2". NSF-approved. *Bul. 80A.*

RIVICLOR

ageless strength

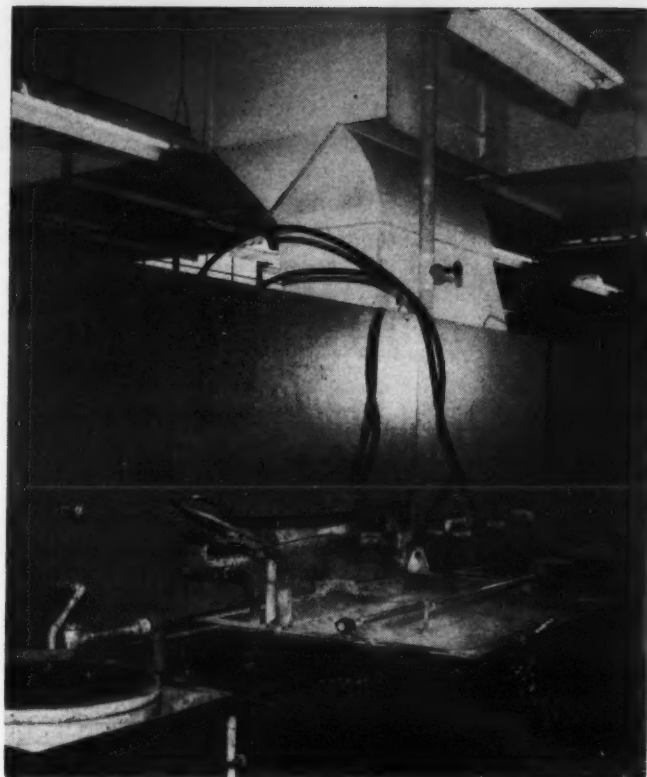


All-purpose rigid PVC. Sched. 40, 80 & 120, 1/2 to 4". Threaded or socket-weld fittings. Valves 1/2 to 2". NSF-approved. *Free Bul. CE-56.*

Still bothered by corrosion?

Downtime, ruined equipment, endless repairs are more than disturbing...they're expensive too. You can put an end to 85 to 100% of your corrosion and contamination losses by specifying chemical-resistant Ace rubber and plastic equipment...pipe, valves, tanks, pumps. American Hard Rubber Company's 108 years of experience is ready to help you with any problem.

CORROSION CONTROL



Plenum behind plating tanks receives vapors through bow-tie opening above tank. Plenum location is on floor in back of tank. With condensibles removed, exhaust system is protected from acid vapors

Corrosion-resistant coating...
plus unique plenum system...

Controls corrosive action successfully in exhaust system

CP EDITORIAL STAFF

with **EUGENE De WITT**, Plating Supt.
Graflex, Inc., Rochester, New York

Problem: Failure of exhaust system due to corrosive acid used in plating component camera parts at Graflex, Inc. at Rochester, New York was occurring frequently. Fumes from the cleaning solutions were drawn off by an exhaust system for venting to the atmosphere.

As is common in plating shops, duct work of the exhaust system was being re-

placed constantly. Humidity, with acid and alkali fumes, combined to produce highly corrosive conditions which overcame the protective coating on the exhaust system ducting.

Surface Preparation

Company does chrome, copper, and nickel plating in several finishes. Sulfuric acid and



processing equipment of rubber and plastics

AMERICAN HARD RUBBER COMPANY
DIVISION OF AMERACE CORPORATION
Ace Road • Butler, New Jersey

Check 3765 opposite last page

FILLED TEFLON* BEARINGS

Chempro Filled-Teflon Bearings are tougher, harder, more wear-resistant and less subject to thermal expansion with the addition of specific filter compounds to virgin Teflon. Ideal for pumps, mixers, reactors and similar equipment where a chemically inert, non-corrosive, non-contaminating and non-adhering bearing material is a must.

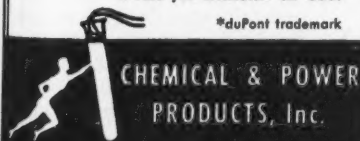
Chemical & Power Products offers a complete Filled-Teflon Bearing service, including Chempro Finished Bearings either Pressed in Housings or without Housings, or Chempro Filled-Teflon Molded Tubes for machining bearings in your shop. Complete machining instructions furnished.

CHEMPRO FILLED TEFLON STYLES

FM-2	Glass-Filled Teflon
FM-3	Carbon-Filled Teflon
FM-4	Glass and Carbon-Filled Teflon
FM-5	Ceramic-Filled Teflon
FM-8	Graphite- and Zircon-Filled Teflon
FM-9	Molybdenum Disulfide and Glass-Filled Teflon
FM-10	Mica- and Glass-Filled Teflon

Write for Bulletin CP-558.

*duPont trademark



CHEMICAL & POWER
PRODUCTS, Inc.

9 Broadway, New York 4, N. Y.

CORROSION CONTROL

alkali cleaners are used to prepare the metal surfaces for plating.

Solution: With the building of a new plant, the plating superintendent resolved to overcome, if possible, this corrosion problem. Combination of a uniquely designed plenum and a plasticized furfuryl alcohol coating, together with an easily-adjusted vent have resulted in a simply-constructed exhaust system, yet very resistant to corrosion.



Dark square (at lower right) is end of plenum chamber. Constructed of concrete and protected by acid-resistant paint and glass membrane plenum has shown no signs of corrosive attack. Note cleanliness of area

Contrary to most exhaust systems in which the plenum is overhead or above the exhaust area, the Graflex installation has the plenum on the floor below and behind the tanks. With weight not a factor, plenum is constructed of four-inch cement block, and covered with $\frac{3}{4}$ " marine plywood. A drainage trench a foot wide and approximately four inches deep runs the entire length of the plenum. Drainage goes to a waste disposal unit. The block wall is covered with an acid-proof lining as is the marine plywood. Space above the plenum is used for service and utility lines.

Bow-tie Exhaust

Because of the relatively large size of the plenum and temperature gradient encountered by vapors entering the plenum, most condensibles in the exhaust gases are removed before going to the overhead exhaust fan.

The exhaust immediately

THE "JOB PROVED" ANSWER TO PLUGGED UP VALVES in CORROSIVE and ABRASIVE SERVICE



- Non-clogging
- Corrosion-resistant
- Full pipe capacity
- Absorbs vibration
- Low replacement costs
- No freeze-up in outdoor service
- No obstructions, pockets or internal parts
- Tight on grits to $\frac{1}{8}$ "
- Maintenance free

Case histories show batteries of Farris FLEX VALVES in severe corrosive and abrasive service for more than 25 years — far surpassing metal valves in efficiency and reliability. FLEX VALVE is the original pinch-type valve, built by Farris to meet industry's need for tough service. FLEX VALVE, in effect, is an integral part of your process piping. Clean FLEX VALVE when pipes are cleaned — the same way! Whether your material is corrosive chemicals, solids in suspension or even wet cement... FLEX VALVE cannot plug! Wide choice of flexible valve bodies for every process need. Manual or motor-operated types and Metal enclosed SuperSeal designs for higher pressures, hazardous service.

FREE TWO VALUABLE BOOKS ON FLEX VALVES

Complete catalog data on the FLEX VALVE line is yours for the asking. Request FL-1116R. Hundreds of uses are listed in FL-935. Also available on request.



GUARANTEED NOT TO PLUG OR YOUR MONEY BACK!

Over 25 Years in Industry's Toughest Service FLEXIBLE VALVE CORP.

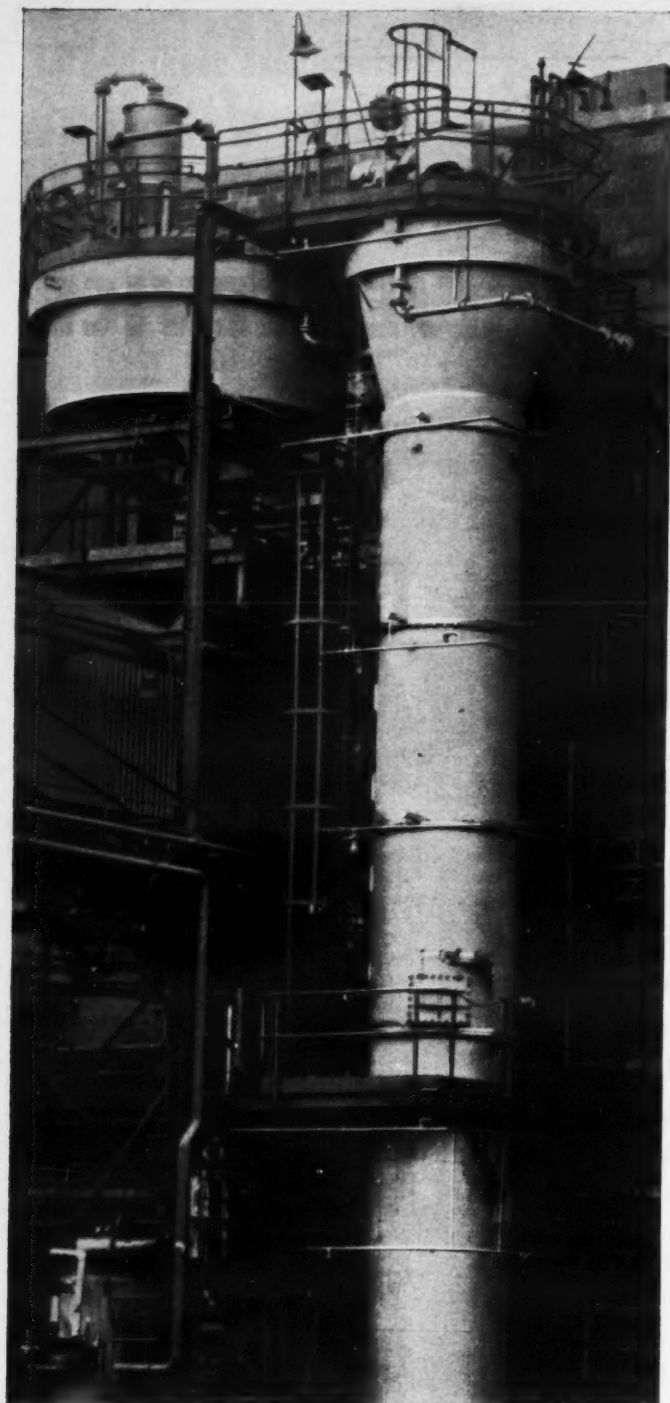
505 COMMERCIAL AVENUE, PALISADES PARK, N. J.
TEXAS FACTORY: 5405 CLINTON DRIVE, HOUSTON 20.

AFFILIATES: FARRIS ENGINEERING CORP. • FARRIS PICKERING GOVERNOR CO., INC. • FARRIS ENGINEERING, LTD. (England)

Representatives in All Principal Cities

Check 3767 opposite last page

Check 3766 opposite last page



Special Manhattan Rubber Lining to resist acidified solvent and abrasive cake is installed in this extraction tower for removal of anti-biotic from mycelia cake.

PERMANENT CORROSION, CONTAMINATION PROTECTION WITH MANHATTAN RUBBER LININGS

Manhattan Acid-Proof Rubber Linings are made from thick, multiple calendered sheets of natural or synthetic rubber for utmost protection and durability. These linings expand and contract with the metal under temperature changes . . . won't harden or crack. Resistance to most acids and alkalis is as fool-proof as 65 years experience and advanced technology can provide.

Every Manhattan Rubber Lining is bonded to metal so securely that they can't be separated . . . Every Manhattan Lined tank is tested under high voltage to assure flawless protection before being shipped to your plant. If the equipment *can't* be shipped to Manhattan, skilled crews will line the equipment in the field.

For permanent, positive protection for your processes and equipment, contact the R/M representative at the Manhattan Rubber Lining plant nearest you.

RUBBER LINING PLANTS AT
PASSAIC, N. J. and NORTH CHARLESTON, S. C.

RM 806

BELTS • HOSE • ROLL COVERINGS • TANK LININGS • INDUSTRIAL RUBBER SPECIALTIES
MANHATTAN RUBBER DIVISION — PASSAIC, NEW JERSEY
RAYBESTOS-MANHATTAN, INC.

Other R/M products: Abrasive and Diamond Wheels • Brake Blocks and Linings • Clutch Facings • Asbestos Textiles • Mechanical Packings • Engineered Plastics • Sintered Metal Products • Industrial Adhesives • Laundry Pads and Covers • Bowling Balls



CORROSION CONTROL

over the plating tanks has bow-tie opening in the panel. This extends the complete width of the tank and has a damper to control velocity. Draft velocities are measured with a pitot tube.

Acid-proof lining in the plenum is a membrane consisting of layers of polymer and glass fiber. The first is polymer, the second is glass, the third is polymer again, and so on. Layers are applied separately. The lining used is based on a plasticized furfuryl alcohol polymer which dries at normal temperature to a hard, glossy, black film.

Adhesion is said to be excellent to wood, hardboard, and other fibrous surfaces. When applied on concrete, a primer must be used. Application time extends over ten days. Chemical resistance of the polymer is such that it is suitable for all acids except highly oxidizing or reducing types. It is resistant to alkalis and most solvents.

Iron Exhaust Ducts

Exhaust duct which leads into the plenum from the bow-tie opening is of black iron. All metal used for exhaust ducts is a 14-gage black iron with a heavy coat of vinyl acid resistant paint applied on exterior. Interior of ventilating duct is lined with a 1/8"-thick lining based on a plasticized Gilsonite fibrous filled formulation applied to the sheet metal by spray gun in three layers. Two additional sealer coats of an air-drying phenolic coating were then applied over the three base coats of plasticized Gilsonite material.

This forms a chemically resistant flexible lining that acts as its own gasket when applied to flange faces. Chemical resistance of this lining is suitable for all acids, alkalis and salts encountered in pickling and plating operations.

Results: The plating superintendent reports that in the one year since the exhaust system has been in use, no evidence of rust and corrosion has been found in the overhead exhaust lines. The fan system, consisting of two 32-

CORROSION CONTROL

000-36,000 cfm units, displays no evidence of rust. Examination of the plenum interior has indicated that the acid-proof lining is withstanding the corrosive fumes without any difficulty.

(Ceilcote F-100 and spray Grade #8314 are products of The Ceilcote Co., Inc., 4832 Ridge Rd., Cleveland 9, Ohio.)

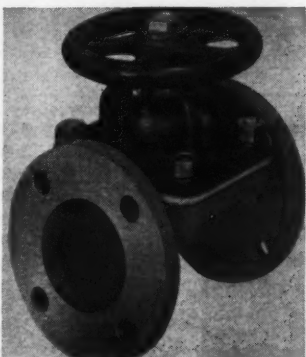
Check 3769 opposite last page.

Higher operating temps, better chem resistance— with lined-valve

Uses: For corrosive services.

Features: Units operate at temperatures up to 300°F and have improved chemical resistance at high operating temperatures.

Description: Diaphragm valve is lined with Penton, a



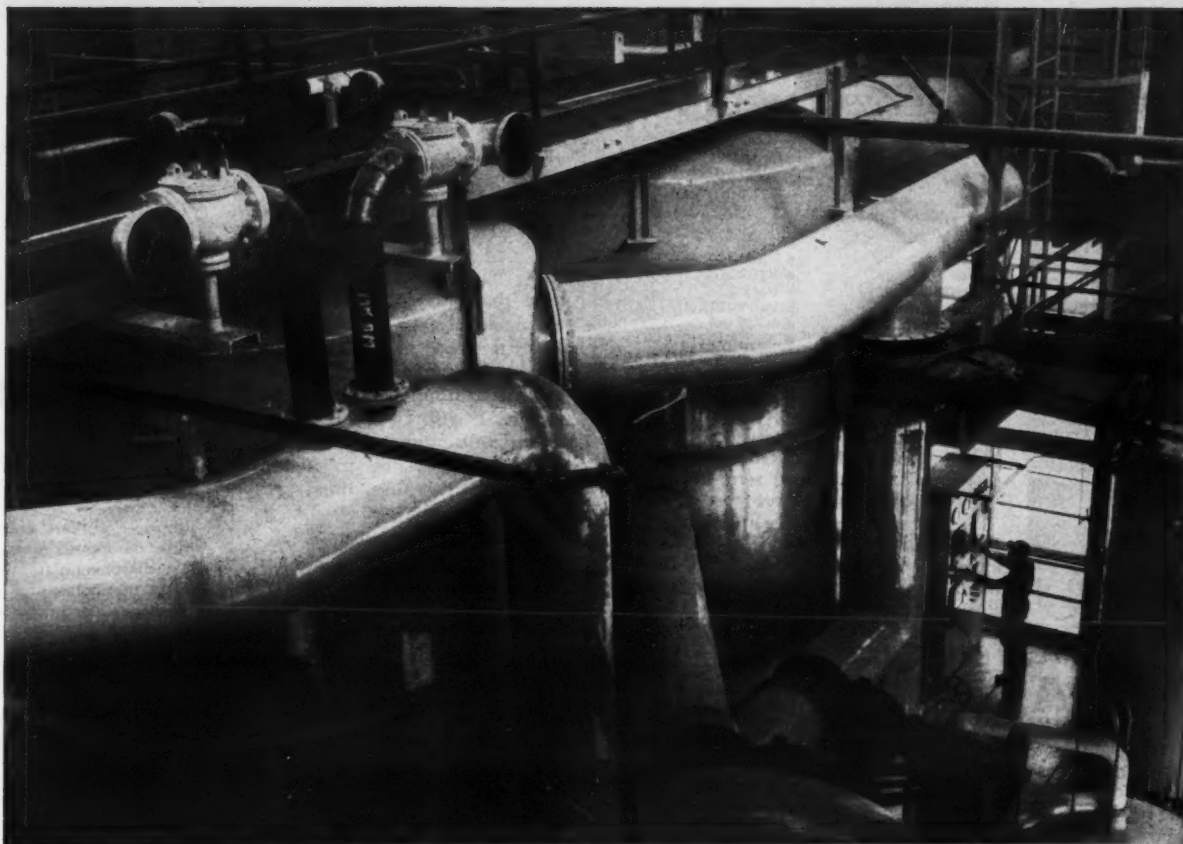
Chlorinated polyether-lined diaphragm valve operates at temperatures up to 300°F

chlorinated polyether. Valves are available in cast iron or aluminum bodies, and are suited for use with metal, plastic, glass, or lined pipe.

Hand-wheel, quick-opening, air, or electric operators are available. Sizes range from ½ to 6", with flanged ends. Valves have packless construction and working parts isolated from flow. Maintenance is simple, and bonnet parts and diaphragms are interchangeable with similarly sized valves.

(Penton-lined diaphragm valve is product of Hills-McCanna Company, 4571 W. Touhy Ave., Chicago 26, Ill.)

Check 3770 opposite last page.



Zarembo evaporator bodies, piping and other equipment of new chlorine-caustic soda plant at Hooker Chemicals, Ltd., North Vancouver, B. C., are

made of Nickel to guard against corrosion, assure product purity. (Much of the equipment supplied by Puget Sound Fabricators, Inc., Seattle).

Nickel "bodyguards" protect new caustic plant

To prevent caustic corrosion . . .

To safeguard product purity . . .

These are the principal reasons why Inco Nickel and Monel* nickel-copper alloy are used in the new


chlorine-caustic soda plant of Hooker Chemicals Limited.

Equipment made of corrosion-resisting Inco Nickel and its alloys frequently gives more than a decade of

service in handling strong caustic. Equally important, Nickel equipment has enabled producers to make millions of tons of caustic a year with less than 100 ppm of metallic impurities.

It will pay you to specify equipment of Inco Nickel, Monel alloy or Nickel-clad steel. Inco Nickel Alloys can be obtained in most mill forms right from warehouse stocks. (Listed under "Nickel" in your classified directory.)

Get complete technical data and service records. Write for "The Resistance of Nickel and Its Alloys to Caustic Alkalies." *Registered trademark

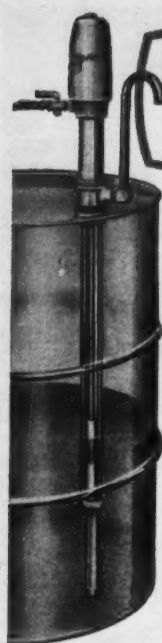
The INTERNATIONAL NICKEL COMPANY, Inc.
67 Wall Street  New York 5, N. Y.

See how Nickel and Monel alloy are used in Hooker's new chlorine-caustic plant equipment

EQUIPMENT	MATERIAL	EQUIPMENT	MATERIAL
Caustic Tank	Nickel-clad steel	Salt receiver tanks	Nickel
Evaporator body	Nickel	Salt separator tanks	Nickel
Second effect vapor body	Nickel-clad steel	Barometric condenser	Monel alloy
Third effect vapor body	Nickel-clad steel	Cylinder coolers	Nickel-clad steel
		Cooling coils	Monel alloy tubing

INCO NICKEL ALLOYS

Check 3771 opposite last page



NOW! FAMOUS *Fast-Flo* PUMP AVAILABLE IN *Stainless Steel*

Safely move...

- ACETONE
- CATSUP
- CHEMICALS
- CHOCOLATE
- COSMETICS
- DETERGENTS
- DYE STUFF
- FATTY ACIDS
- FREON
- GLUE, LATEX
- GLUE, WOOD
- HAIR TONIC
- HYDROFLUORIC ACID
- INKS
- LACQUERS
- MUSTARD
- PHOSPHORIC ACID
- SHAVE LOTION
- SEALERS
- SOY SAUCE

The new Stainless Steel Fast-Flo Pumps by Graco are now pumping and dispensing these and other corrosive, "handle-with-care" liquids and semi-fluids... quickly, safely and direct-from-drum!

Say goodbye to spillage and waste, eliminate danger of contamination to your expensive liquids and semi-fluids. Investigate this new Stainless Steel air-powered Fast-Flo Pump by Graco!

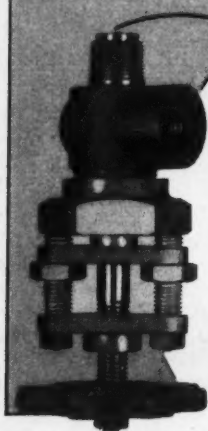
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OR SEE YOUR LOCAL INDUSTRIAL DISTRIBUTOR

GRACO *Fast-Flo* "DIRECT-FROM-DRUM" PUMPS

GRAY COMPANY, INC. • Engineers and Manufacturers
22 Graco Square, Minneapolis 13, Minnesota
FACTORY BRANCHES: New York (Long Island City) • Philadelphia •
Detroit • Chicago • Atlanta • Houston • San Francisco
SALES OFFICES: Washington • Toronto

Check 3772 opposite last page

New! Jerguson Drain or Sampling Valve



- completely self-draining
- withstands severe conditions
- foolproof operation

The new Jerguson No. 23 Drain or Sampling Valve is completely self-draining, for the valve stem seats on the outside of the valve body. It is ideal for installations where it is desirable to have the valve seat inside the wall of the vessel in order to prevent the typical condition of liquid remaining in the nipple and valve inlet.

This rugged, new Jerguson Valve has outside screw and yoke construction to meet high temperature or corrosive conditions where inside threads cannot be tolerated. The efficient outside thread design eliminates possible freezing and allows the valve stem to work freely at all times. The No. 23 Valve provides foolproof operation because the stem is constructed with a left-hand thread, thus allowing the valve handle to operate in the normal direction of standard valves.

Write for data unit
and complete details

JERGUSON

JERGUSON GAGE & VALVE COMPANY
100 Adams Street, Burlington, Mass.

Offices in Major Cities. In Canada: Peacock Bros. Ltd.
In England: Jerguson Trest Gage & Valve Co. In France: Pétrole Service

Gages and Valves
for the Observation
of Liquids and Levels

Check 3773 opposite last page

CORROSION CONTROL

Tantalum-lined reactor offers 4 industries new corrosion-battling tool

All surfaces which contact product are protected

A reactor lined with corrosion-resistant tantalum has been developed with an eye toward usage in the chemical, food processing, pulp and paper, and atomic energy fields.

Initial effort is a 30-gal vessel, although manufacturer reports it is ready to custom fabricate tantalum-lined reactors immediately.

The 30-gal reactor is designed to operate at 650°F and 500 psi. Chamber consists of a .030 tantalum liner with a 5/8" outer shell of Type 430 stainless steel.

Manufacturer reports that all surfaces which contact product are tantalum. These include a turbine-type, tantalum-sheathed agitator shaft, solid tantalum agitator and baffle, and tantalum immersion type bayonet heater. Vessel, without drive, weighs approximately 700 lb.

(Reactor is manufactured by The Pfaudler Co., a division of Pfaudler Permutit Inc., 1078 West Avenue, Rochester 3, New York.)

Check 3774 opposite last page.

(Tantalum liner is produced by Haynes Stellite Company, Kokomo, Ind.)

Check 3775 opposite last page.

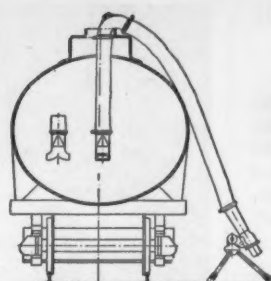
Corrosion-resistant pipe of impervious graphite fitted easily in field

System uses glass fiber armor

Uses: For handling corrosive fluids.

Features: System can be fitted easily in field with only hacksaw and wrench because it is made of impervious graphite. Wall thickness is approximately twice that formerly used.

Description: Impervious graphite pipe system utilizes glass fiber armor to protect against physical abuse. Stand-



TANK CAR is easily freed of fumes for workers' safety.



CHEMICAL STILL is here vented while being repaired.

KEEP AIR FRESH

in confined places
with COPPUS

Design "A" Ventilator

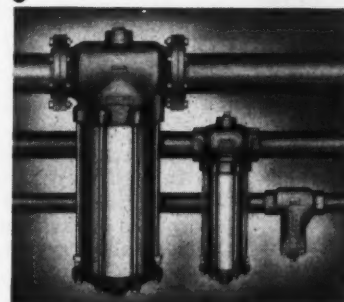
Improve workers' safety—health—comfort—efficiency. Get rid of dangerous gases, fumes, stagnant air. Coppus Design "A" Ventilator ventilates tanks, tank cars, drums, vats, underground cable manholes, pipe galleries, airplane wing compartments, fuselages. For complete information, write Coppus Engineering Corporation, 382 Park Ave., Worcester 2, Mass. Sales Offices in Thomas' Register.

Other "Blue Ribbon" Products in Chemical Engineering Catalog, Refinery Catalog, Best's Safety Directory and Mining Catalogs.



Check 3776 opposite last page

LINE STRAINERS



for
SPRAY
NOZZLE
SYSTEMS
and
RELATED
APPLICATIONS

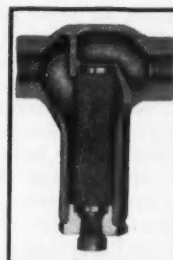
in stainless steel, cast iron and brass

A complete range of capacities in 1/4" to 4" female pipe connection sizes... and in 3" to 6" flange connection sizes. Keeps lines clear for efficient operation. Easily flushed.

TOP PERFORMANCE DESIGN
Screen area so large that strainers will take 75% blocking with less than 1/2 lb. pressure drop under normal flow conditions. Top and bottom flange collars on screen give seal fit and rigidity.

SPRAYING SYSTEMS CO.

3216 Randolph Street
Bellwood, Illinois



WRITE FOR your free
copy of BULLETIN 94
...gives complete
information

Check 3777 opposite last page

CHEMICAL PROCESSING

CORROSION CONTROL

ard ASA flange bolt circles permit attachment to existing equipment or other pipe, and the I.D. dimension equals listed pipe size dimension to simplify calculations.

Impervious graphite material from which pipe is extruded is not affected by corrosives, except a few highly



Short lengths of impervious graphite pipe can be easily made up in field

oxidizing agents. It is non-contaminating and immune to effects of thermal shock. Pipe is recommended for use at temperatures to 340°F at pressures to 75 psi hydrostatic (50 psi steam).

(Impervite pipe system is product of Falls Industries, Inc., Aurora Road, Solon, Ohio.)

Check 3778 opposite last page.

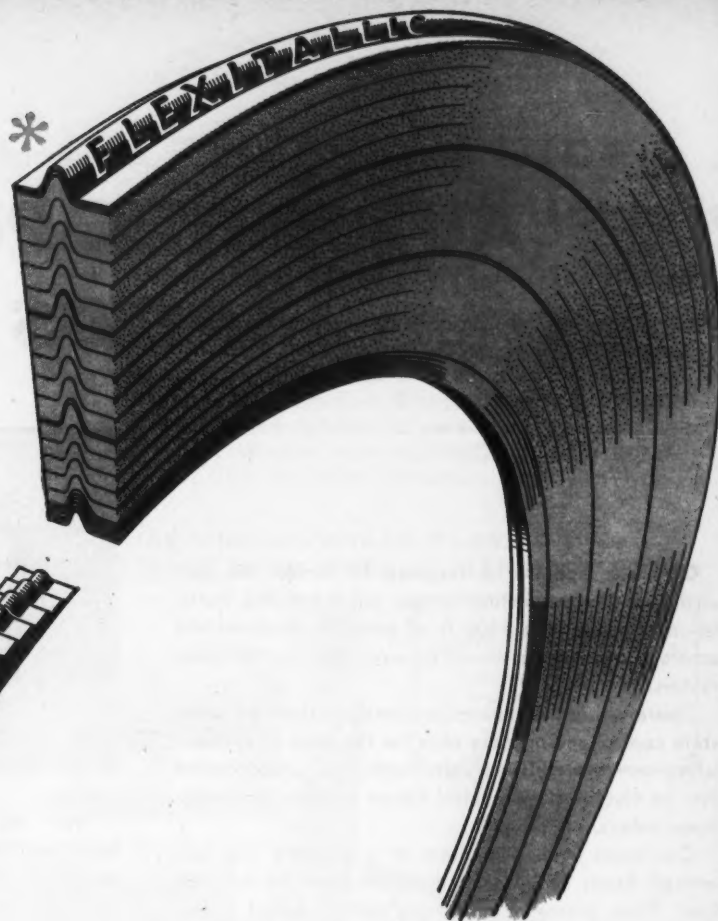
Alloy resists corrosion better than titanium in certain media

A titanium alloy containing 2½% aluminum and 16% vanadium has shown better corrosion resistance than pure titanium in certain media. One of four titanium alloys developed by company, it provides a material which can be easily worked in a low strength condition and then age-hardened or strengthened to high tensile strength.

It exhibits a high tolerance for hydrogen, at least 500 ppm. This is four times the existing hydrogen tolerance of present commercial alloys.

(MST-2½ Al-16V titanium alloy is development of Malory-Sharon Metals Corp., Niles, Ohio.)

Check 3779 opposite last page.



THE ENGINEERED GASKET **is identified by Flexitallic Blue**

In Flexitallic Spiral-Wound Gaskets, the compression characteristics for a given pressure series are always directly related to the bolting load for that series.

Using precise determinations of yield values, resilience, and gasket stability, Flexitallic engineers build each gasket to an exact standard of performance.

That's the meaning of Flexitallic Blue. The blue dye in the Canadian asbestos filler identifies the one Spiral-Wound Gasket built since 1912 on the original Flexitallic principle.

Because each Flexitallic Gasket is specifically designed for a particular service, you get performance you can depend on. As the service becomes more hazardous, the need for Flexitallic Gaskets becomes more urgent.

FLEXITALLIC GASKET CO.
8th & Bailey Sts. Camden 2, N. J.

Flexitallic
SPIRAL-WOUND GASKETS

FOR PIPE FLANGES, PRESSURE VESSELS AND PROCESS EQUIPMENT

*Flexitallic is a registered tradename. No one else can make a Flexitallic Gasket. Look for Flexitallic Blue — it's our exclusive blue-dyed Canadian asbestos filler.

Check 3780 opposite last page

AUTOMATIC Palletization System

SPEEDS In-plant Warehousing

Only one operator is required to control the vast sorting and accumulating system which entailed installation of more than 7300 ft of complex, electronically controlled conveyors driven by over 200 electric gear-motors.

Contained in the cabinet to operator's right are solid-state control and memory units for the maze of accumulating conveyors. These units have been incorporated into an electric static control system in place of conventional relays.

Conveyors keep each item in a separate line until enough boxes or bags have accumulated for a pallet load. Then, preset programming controls select proper loading pattern without operator's attention, and route items to correct palletizer. Accumulating and sorting lines are suspended 40 ft in air to utilize space between roof and first floor.



From the accumulating system, boxes, bags, and bales are sent to one of eight palletizers. These are extra large in order to handle oversize pallets, which measure 60" x 40".

Palletizers fashion items into an interlocking pattern on a stripper plate. When layer is full, it is deposited atop preceding layer on pallet. When pallet is full (its load size is predetermined automatically), it moves out onto a chain-driven live roller conveyor take-off system. An empty pallet is brought into place from automatic magazine in the palletizer.

Loads are accurately stabilized in bag palletization system. Lateral spacing blocks on five of the eight palletizers are lowered from a traveling carriage above the palletizer as each layer is laid down, thus providing space to position each bag properly in the stack for greatest stability.

Reciprocating vertical conveyor (left) brings empty pallets to palletizer floor, where they are moved by fork truck to palletizers.

Another conveyor (at right background) lowers loaded pallets to first floor, where fork trucks speed them to specific areas from which rail, truck or water shipments emanate.

THIS PICTURE STORY presents some of the highlights in operation of the \$1.6-million completely automated palletization system at the huge cane sugar refinery warehouse of California and Hawaiian Sugar Refining Corporation Limited, Crockett, Calif.

C and H installation pioneered the mechanical sorting, accumulating and palletizing of bagged items in 25-, 50-, and 100-lb sizes.

(Automatic palletizers and warehouse control system were engineered by C and H personnel and Lamson Corporation, 303 Lamson St., Syracuse 1, N. Y.)

Check 3781 opposite last page.

(Sorting station static control system is product of General Electric Company, 1 River Rd., Schenectady 5, N. Y.)

Check 3782 opposite last page.



SEVEN IMPORTANT RESULTS of C and H's PROGRAM

Here's what California and Hawaiian Sugar achieved by mechanizing its in-plant warehouse handling at its Crockett, Calif., cane sugar refinery.

1. Increased efficiency of manpower.
2. Reduced damage to packaged sugar, an inherent result of hand palletization.
3. Eliminated costly rehandling and higher container costs — also inherent to hand palletization.
4. Improved stacking of boxes, bags, and bales.
5. Made better use of storage area because of better balanced and more uniformly stacked pallets.
6. Facilitated flexibility in warehouse handling. Formerly, workers had to change conveyor route manually. Now, only a few switches must be reset whenever a product changeover is necessary.
7. Removed safety hazard to workers by the elimination of much of the heavy lifting involved in warehouse palletizing operations.



Loaded pallets are discharged onto a common conveyor (upper left) located between the two lines of palletizers.

By means of a preset switch arrangement, each of the eight palletizers routes loaded pallets by means of two turntables, shown here, to one of three vertical conveyors or to storage area on same floor.

BE ON THE SAFE SIDE... and cut handling cost doing it

WITH ALLIS-CHALMERS LIFT TRUCKS

Allis-Chalmers lift trucks are built to *produce* and *protect*. Ask any user about their performance... how they out-manuever... how you can count on them for long life with low maintenance.

Then check on the many ways they protect men and equipment. Note their sure-footed stability on steep grades... strength from frame to mast... freedom from obstructions in the operator's compartment... location of the fuel tank — away from the engine.

FOR HAZARDOUS AREAS PLAY IT REAL SAFE WITH SPECIAL SAFETY TRUCKS



Allis-Chalmers GS (gasoline safety), LPS (LP gas safety) and DS (diesel safety) Trucks bear the Underwriters' Laboratories inspection seal for working in areas where there are flammable liquids or gases, combustible dusts or ignitable fibers.

Accepted by
MILL MUTUAL
FIRE PREVENTION
BUREAU

Allis-Chalmers DX Safety Diesel Lift Trucks were developed to provide exceptional protection against explosions. The starter is hydraulic, gauges are mechanical, water manifold and muffler reduce temperature of usually-hot surfaces and quench exhaust sparks.

No matter what the job, your Allis-Chalmers material handling dealer can show you how you can have the best in both production and protection. Allis-Chalmers, Milwaukee 1, Wisconsin.

ALLIS-CHALMERS

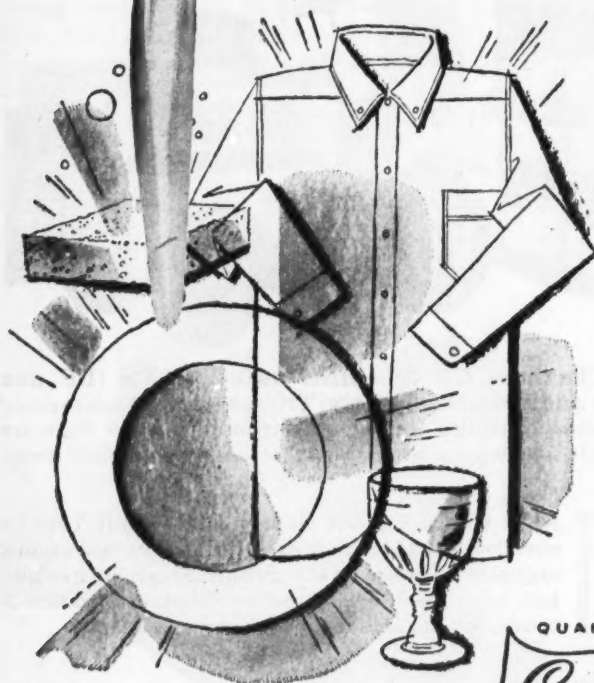


Check 3783 opposite last page



FLUID FLOW CANS BY CONTINENTAL BEST FOR *Detergents,*

*ammonia and
other household products*



Whether your product is a detergent or some other household product, you'll clean up more sales when you give it the customer-pleasing advantages of Continental Fluid Flow cans. Look at these features!
No drip nozzle of polyethylene for free flow and exact dripless cutoff.

Wrap around lithography: Solderless construction leaves entire can (dome top, too) free for decoration with Continental's superb lithography.

Matchless beauty that lasts: Protected by a special varnish that prevents marring of lithography during display.

Unsurpassed product protection insured by specially developed enamel linings.

Colored nozzles to match or contrast with can design for added sales appeal.

Get the best can for your household products, *plus* Continental research and engineering service. Call Continental today.



WIDEST RANGE OF SIZES!

Continental Fluid Flow cans are available in the widest range of sizes, every size you want to satisfy your customer's needs, from 12 oz. to one-half gal.

Eastern Division: 100 E. 42nd St., New York 17
Central Division: 135 So. La Salle St., Chicago 3
Pacific Division: Russ Building, San Francisco 4
Canadian Division: 5595 Pare St., Montreal, Que.

Check 3784 opposite last page

HANDLING & PACKAGING



Special heavy-duty 'V' type belt . . .

. . . actuates this power-driven live-roller conveyor. Conveyor is manufactured with straight face or tapered rollers in various diameters and lengths of rollers to suit particular application. Standard 4'6" and 6'0" radius are manufactured. Curves of 45°, 90°, and 180° are available.

(Power driven live roller conveyor is manufactured by Sage Equipment Company, Inc., 32 Essex St., Buffalo 13, N.Y.)

Check 3785 opp. last page.

Pick-up and drop-off of 40-cu-yd loads done from cab

Cuts costs, ups efficiency

Uses: System is designed for handling bulk materials in detachable containers.

Features: Entire operation of system can be performed by truck driver. Ability of one truck to handle any number of containers cuts down on investment in maintenance, insurance, licensing, and capital outlay for fleet of rolling stock. Containers can be loaded and unloaded at convenience of shipper or receiver without tying up truck or truck crew.

Description: Detachable containers are mounted on single-axle or tandem-axle truck. System is designed to handle

HANDLING & PACKAGING

containers in capacities to 40 cu yd and 30,000-lb net payloads. Single lever, mounted on dashboard inside cab, enables truck driver to pick up, haul, or drop off containers. Unit is powered entirely by hydraulics, assuring accurate control and high degree of safety.

Detachable containers are available open or closed. Sizes range from flat bed to 10-, 15-, 20-, 25-, and 30-cu-yd standard units. Special containers are available to 40-cu-yd capacities. All closed contain-



Using a single lever, mounted on dashboard inside cab, truck driver can pick up, haul, dump, or drop off any number of detachable containers

ers are equipped with two top charging doors that open to expose an unobstructed charging area of 70½ x 177". Containers are tapered to give a wider opening at rear discharge area for clean, complete dumping.

(Huge Haul system is manufactured by Ingersoll Kalamazoo Div., Borg-Warner Corp., 1810 North Pitcher St., Kalamazoo, Michigan.)

Check 3786 opposite last page.



Permaglas Storage Structures eliminate packaging costs

Texas Corporation maintains contamination-free operation in changing from costly packaging to economical bulk handling.

Towering above the flat Texas Plain at Big Spring—four Permaglas Storage Structures testify to the wisdom of the change from packaged to bulk materials-handling and storage.

ding and storage.

Specified by Blaw-Knox engineers, materials-handling consultants for a wide variety of industries such as foodstuffs,

chemicals, feed ingredients, rubber, plastics and pharmaceuticals—the Permaglas Structures met all requirements. These steel structures—glass-protected inside and out* safeguard products from contamination and discoloration ... and are ideal for storing bulk materials—granular, flaky, pulverized, hygroscopic, contaminable, edible or non-edible.

Delivered and erected quickly at low cost, the Permaglas Structures require little maintenance—no need for painting.

Permaglas system planning service helps you evaluate your materials-handling methods. The Permaglas man in your area will work with you and your staff to give you a complete and factual description, cost summary and recommendation on your present or future materials-handling system. The Permaglas Service includes data on A. O. Smith's exclusive mechanical sweep-arm bottom unloader for complete mechanization of your bulk handling and storage operation.

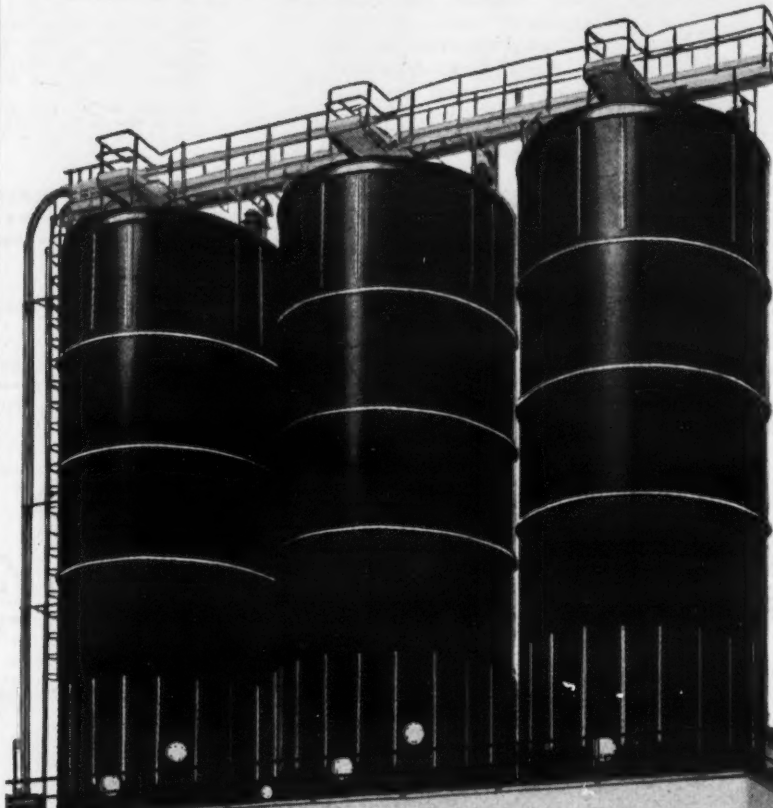
* HYDRASTEEL PROCESS covered by U. S. Patent No. 2,754,222

Through research ... a better way

A.O. Smith

HARVESTORE PRODUCTS
Kankakee, Illinois

A. O. Smith INTERNATIONAL S. A., Milwaukee 1, Wis., U.S.A.



A. O. SMITH CORPORATION

Harvestore Products, Kankakee, Ill., Dept. CP-29

I am interested in obtaining more facts on Permaglas Mechanized Storage Units.

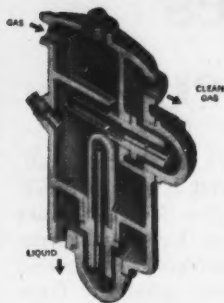
- ☐ Please have representative call for appointment
☐ Send me latest Permaglas Mechanized Storage Unit details

Name
Firm
Address
City Zone State

Cosden Petroleum Corporation's three 20' x 50' Permaglas Bulk Storage Structures are loaded by pneumatic conveyor. They discharge ½" cube polystyrene molding pellets by gravity into bulk transfer trucks below. A fourth 14' x 15' Permaglas Structure safely stores crumb rubber.

Check 3787 opposite last page

SELAS Liquid-Gas SEPARATION



Selas Liqui-Jectors serve

Manufacturers of:
Chemicals
Pharmaceuticals
Pneumatic instruments
Hospitals
Food processors
Pneumatic instrument users
Pneumatic tool users
Metal fabricators
Steel plants
Petroleum refineries

for completely effective removal of entrained liquids and solids from AIR, GAS and STEAM SYSTEMS

Selas Liqui-Jectors utilize basic principles of capillary physics and surface chemistry. Protect air, gas and steam systems and pneumatically-operated instruments and mechanisms from effects of entrained water, oil, water-oil emulsions and dirt.

Easily installed, no moving parts, minimum maintenance. Standard models available for capacities up to 7000 scfm at pressures up to 200 psig. Units custom-built for larger volumes, higher pressures and special conditions.

Send for new Bulletin 142

Liqui-Jector is a registered trade name of Selas Corporation of America

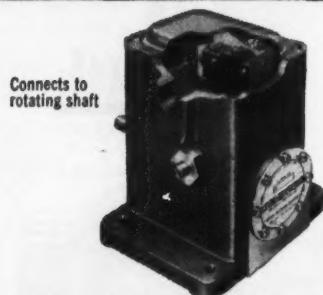
SELAS
CORPORATION OF AMERICA
DREXEL, PENNSYLVANIA

Heat and Fluid Processing Engineers
DEVELOPMENT • DESIGN • CONSTRUCTION



Check 3788 opposite last page

NEW ROTO-GUARD[®] SHAFT MOTION INDICATOR



Connects to rotating shaft

Actuates warning lights or other signals.
Operates control switches.

PROVIDES positive indication of drop in speed or stopping of machinery

PROTECTS conveyors • elevators • feeders • belt conveyors
OPERATING SPEEDS of 10 to 150 rpm make the ROTO-GUARD applicable to automatic protection of slow-moving machinery used in material handling and similar systems
RUGGED AND COMPACT: approx. 5" x 6" x 6".

SIMPLE • POSITIVE • RELIABLE • LOW COST

A Development of

THE BIN-DICATOR COMPANY
13946-D Kercheval • Detroit 15, Michigan

Specialists in Automatic Control Devices for Material Handling Systems for Over 20 Years

*TRADE MARK

WE SELL DIRECT • PHONE ORDERS COLLECT

Write for Bulletin RG-16

Check 3789 opposite last page

HANDLING & PACKAGING

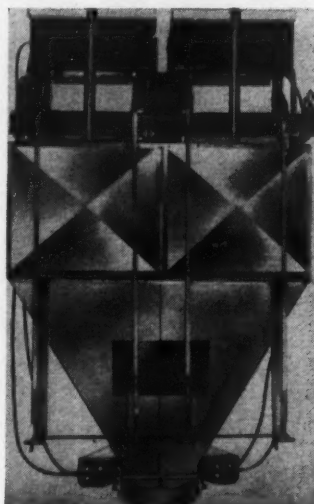
Speedy, accurate filling;
single, dual operation
with packing scale

Unit fills 50-lb bags at rate of 30 per minute

Uses: For weighing and bagging bulk materials.

Features: Unit can accurately fill thirty 50-lb bags per minute. Double feeder permits either single or dual operation, and control panel provides operator with continual view of scale's operational cycle.

Description: Automatic duplex filling unit consists of two net weigher scales discharging into a common hopper. In op-



Capable of either single or dual operation, automatic duplex filling unit accurately fills up to 30 bags per minute

eration, a supply feeder feeds material to the weigh hoppers. As one is being filled and weighed, the other is discharging into the bag.

Scale can be either manually dumped by a foot switch or automatically dumped into empty packages on a synchronized conveyor. Unit can be set to make from 25 to 30 dumps per minute for package capacities of 25 to 100 pounds each.

(Model 2N18CC automatic duplex filling unit is product of Thayer Scale Corporation, Pembroke, Mass.)

Check 3790 opposite last page.

VIBROLATOR

"WORLD'S QUIETEST VIBRATORS"

MOVES MATERIAL



This vibration inducer has only one moving part — a rolling ball. Works perfectly on wet or dirty air. Need no lubricator. Guaranteed self-starting always. Operates continuously in very hot locations. Absolutely spark-free for hazardous jobs.

The Vibrolator moves material out of hoppers, down chutes and through screens. Compacts concrete in forms or granulars in boxes or drums.

Available in 14 sizes, priced from \$12 to \$150. "pocket-watch" size to new 28 lb. UCV-64, shown here. Never harms equipment on which it is mounted. Write for catalog today.

MARTIN ENGINEERING COMPANY
155 KEMP STREET • NEPONSET, ILLINOIS



HOPPERS



CHUTES



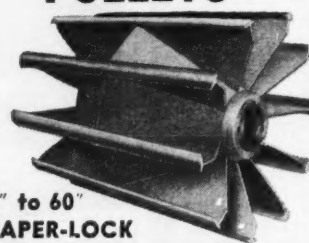
BINS



MOLDS

Check 3791 opposite last page

Use VAN GORP Turn-Clean PULLEYS



STOP BUILD UP!

8" to 60"

TAPER-LOCK

VAN GORP Self-Cleaning PULLEYS

STOP BUILD UP

Van Gorp Self-Cleaning Pulleys offer individual wing construction that prevents any material build-up between the belt and pulley. Self-cleaning cone design automatically discharges foreign material to the sides of the pulley. It is no longer necessary to spend valuable time cleaning material from belt or pulley. Van Gorp Pulleys stay clean and insure proper belt alignment. Reduce your maintenance costs! Be sure you specify Van Gorp TURN-CLEAN Pulleys with Dodge TAPER-LOCK bushings on all your conveyors or bucket elevators.

CATALOG OF OVER 3,000 SIZES ON REQUEST

Van Gorp Mfg. Inc.

PELLA, IOWA



Check 3792 opposite last page

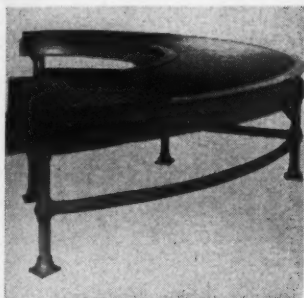
CHEMICAL PROCESSING

HANDLING & PACKAGING

Long mesh-belt life for conveyor curve

Uses: Designed for conveying products around curves. Open construction fosters circulation of air or heat, draining of liquids.

Features: Minimum metal-mesh belt wear, since belt is woven to taper to fit inner and outer radii of curve. Thus, there is no lateral flexing as it



Moves 2000-lb loads at speeds to 200 fpm

negotiates turn. Belt slides on nylon slider rails, or full-width wood slider bed, further minimizing wear because of the low friction.

Description: Conveyor is complete section utilizing woven-wire belt, welded structure, tubular steel supports, adjustable takeup, and, if desired, its own drive system. It will carry 2000-lb load at speeds to 200 fpm.

Rods are inserted through spirals of the mesh and connected to multiplane chains which travel along inner and outer edge of curve. Chains are sprocket-driven at each tapered end pulley.

Any reasonable belt width may be turned on 24" minimum inside radius.

(Taperweave curve conveyor is product of Wiretyer Corporation, 65 Leliarts Lane, East Paterson, N. J.)

Check 3793 opposite last page.

Rack framing by slotted angles is described, two pages of photographs show various assembly methods, give data and load tables in Bul 938 — The FlexAngle Corp., 3760 Oakwood Ave., Youngstown 1, Ohio.

Check 3794 opposite last page.



VISQUEEN

TRADEMARK

'L'

FILM



If you make giant balloons light and strong enough to soar into the upper atmospheres . . . or ship corrosives, acids and adhesives . . . or transport hydroscopics in drums or cartons—look to VISQUEEN 'L' film to do the job better, less expensively. VISQUEEN 'L' film is stronger . . . tougher . . . as pinhole free as a polyethylene film can be. Write for samples.

VISQUEEN film—first and foremost polyethylene film.

A product of the long experience and outstanding research of

PLASTICS DIVISION

Division of



Corporation

VISKING COMPANY

P.O. Box CP2, 6733 W. 65th St., Chicago 38, Ill.

In Canada: VISKING COMPANY DIVISION OF UNION CARBIDE CANADA LIMITED, Lindsay, Ontario.

VISQUEEN, VISKING and UNION CARBIDE are registered trademarks of Union Carbide Corporation.



Check 3795 opposite last page

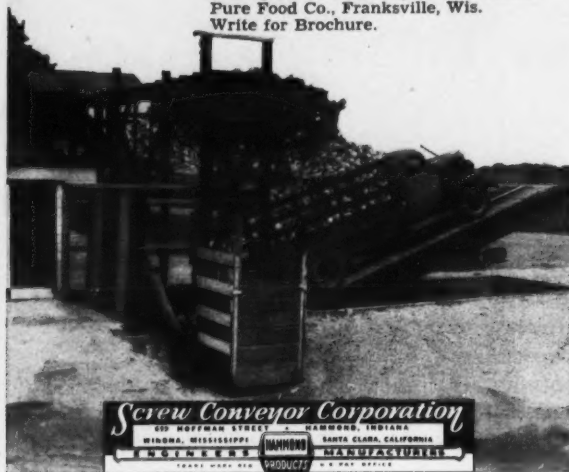
Kewanee HYDRAULIC TRUCK DUMPERS

- CUT HANDLING COSTS
- SIMPLIFY UNLOADING
- DAMAGE TO MATERIAL DRASTICALLY CUT

"Kewanee" Hydraulic Dumpers are manufactured in 25 ft., 45 ft., 50 ft. and 60 ft., platform sizes to handle small trucks to the largest tractor-trailer combinations.

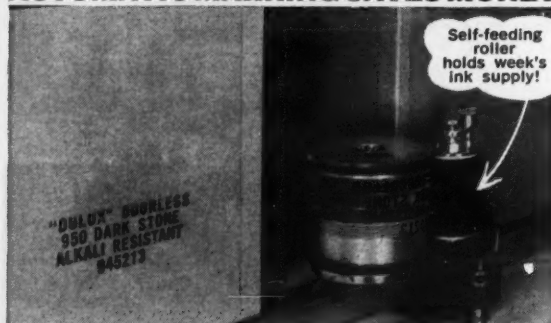
They are in use throughout North America handling grains, cotton-seed and other bulk materials. Exclusive design—finest construction.

Photo shows 25 ft. Kewanee handling cabbage at sour kraut plant of Franks Pure Food Co., Franksville, Wis. Write for Brochure.



Check 3796 opposite last page

AUTOMATIC MARKING SAVES MONEY



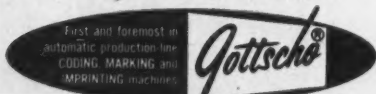
New ROLACODER conveyor and case-sealer attachment marks boxes, cartons, drums, filled bags automatically

Saves on container printing costs... eliminates hand-stamping... insures faster identification

- Low-cost... pays for itself in months
- Compact... works by friction... requires no troublesome adjustments
- Install it yourself on any conveyor, case-sealer, etc. to mark from side or top
- Not a gadget — beautifully designed and precision-made to give consistently dependable performance, uniform impressions
- Patented type base holds type and dies securely, makes copy changing easy
- Spots imprints accurately in any desired location
- Many thousands in use by all industries

Models to suit every need... including twin-action units for marking 2 or 4 sides of cases simultaneously.

Write today for Bulletin "ROL-3" DEPT. W



GOTTSCHO HILLSIDE 5, N.J.

In Canada: Richardson Agencies, Ltd. • Toronto & Montreal
Check 3797 opposite last page

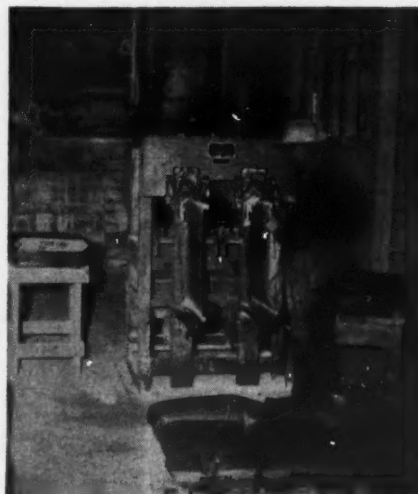
MATERIAL HANDLING and PACKAGING

Because no moving parts of filling machine come into direct contact with material, maintenance is practically unnecessary



Packaging machine that operates with minimum of dust and maintains accurate weights without slowing production...

Fluidizes calcium carbonate, soothes packaging headache



Two-tube fluidizing filling machine permits packaging of calcium carbonate with accurate weights and a minimum of blow-back

Problem: The fineness of dry calcium carbonate, plus its heavy weight, made it impossible to obtain a satisfactory packing operation with conventional packing equipment at Georgia Marble Company, Tate, Georgia. The calcium carbonate ranges in size from 18 mesh to fine dust, and weighs approximately 95 lb per cu ft.

Solution: Installation of a machine that fluidizes the material makes it possible to package the calcium carbonate satisfactorily.

This fluidizing operation is achieved when compressed air is introduced at low pressure through an air pad at bottom of conditioning chamber, surrounds particles of material at base of chamber, and makes them buoyant or fluidized.

Weight of material in conditioning chamber and supply bin above creates pressure on these fluidized particles and ejects them through a filling tube into bag. "Heads" of material required can

vary from 6 to 18 ft, depending upon characteristics of product.

The Georgia Marble installation consists of a two-tube filling machine. However, the machine is available in single- and multiple-tube models to permit production ranging from 1 to more than 20 bags per minute. It is adaptable for both hand and automatic discharge mechanisms.

Results: Fluidizing the material makes it possible to package the calcium carbonate with a minimum of dust and blow-back, and to maintain acceptable weight tolerances (variation is seldom more than plus or minus four ounces) without slowing production. According to plant superintendent, expanding valve sealer eliminates blow-back from valve during filling cycle, and permits extremely clean operation.

Georgia Marble's production manager says that no maintenance has been required during an eight-month period of machine operation. This is attributed to the fact that no moving parts come into direct contact with the material.

Less aeration of the product is another advantage of the machine. This makes possible a savings in bag size for many products.

(Fluopacker filling machine, originated and manufactured by Food Machinery and Chemical Corporation, is sold and serviced exclusively by St. Regis Paper Company, 150 East 42nd St., New York 17, New York.)

Check 3798 opposite last page.


Material handling equipment leasing methods are detailed in four-page circular that discusses three plans to acquire equipment without tying up working capital. Leasing circular — Lewis-Shepard Products, Inc., Dept. R8-26, 125 Walnut St., Watertown 72, Mass.

Check 3799 opposite last page.

Vibratory dryers and feeders for heavy and extra-heavy duty are shown on two-page Data Sheet PO 47073 — Syntron Co., 110 Lexington Ave., Homer City, Pa.

Check 3800 opposite last page.

New H-25 PAYLOADER



"larger load capacity, good load-carrying balance and faster delivery"



Model H-25 is the only tractor-shovel in its class having power-transfer differential, and power-shift transmission with two speed ranges in both forward and reverse.

*"Operators like the ease of operation too," adds Ben Lipscomb, Supt., Kentucky Fertilizer Works, Winchester, Ky.

"We have been using "PAYLOADER" tractor-shovels better than 9 years with exceptionally good production records" says Mr. Lipscomb. "We find they stand up under tough duty work with minimum repairs. Each new Hough has advanced design that gives more plant efficiency over previous models."

The extra "load capacity" to which he refers is the 2500 lb. carry capacity — 500 lb. more than previously available in a machine of this class. The "ease of operation" and "faster delivery" are products of power-steer, power-shift transmission (no clutching); greater engine power, 4,500 lbs. of breakout force and shortest turning radius of 72 in.

There are many other reasons why the H-25 will dig, carry and deliver more tonnage with lower operating and maintenance costs than anything in its class.

It has extraordinary protection against dust and dirt damage: triple air cleaners — pre-cleaner and two oil-bath air cleaners; cartridge-type oil filters on the three oil systems; sealed self-adjusting hydraulic service brakes; parking brake enclosed in transmission; special oil and grease seals on all vital points.

Ask your "PAYLOADER" Distributor for a demonstration of the great new Model H-25.

THE FRANK G. HOUGH CO.
744 Sunnyside Ave., Libertyville, Ill.

☐ Send data on new H-25 "PAYLOADER"

☐ Other 2-wheel-drive types ☐ Larger 4-wheel-drive types

Name _____

Title _____

Company _____

Street _____

City _____

State _____

2-A-1

HOUGH®

THE FRANK G. HOUGH CO.
LIBERTYVILLE, ILLINOIS
SUBSIDIARY — INTERNATIONAL HARVESTER COMPANY

Check 3801 opposite last page

New Invention Picks Up 40 Cu. Yd. Detachable Containers . . . 15-Ton Loads



Dinosaur picks up in excess of 30,000 pounds of granular material, white line inside container indicates load has not shifted.

DEMPSTER-DINOSAUR Combines Detachable Container Flexibility With Big Pay-Load Capacity

Unlimited Capacity

The proven savings of mechanically handled detachable containers have now been expanded to cover long, over-the-road hauls. Two DINOSAUR models are available for this work. One, for tandem trucks, handles 30,000 pounds; the other, for single axle trucks, handles 22,000 pounds. Special off-the-road models are available for loads limited only by the capacity of the truck.

For Docks and Flat Cars

Mechanically, the DEMPSTER-DINOSAUR is of extremely simple design. Components are a tipping frame, two hydraulic raise-and-lower cylinders and a double-acting cylinder which con-

trols all container movements. No chains, sheaves or cables are used in its operation. It is the only over-the-road system that can push and pull containers on and off docks or railroad flat cars. This makes it possible to use the DINOSAUR in conjunction with "boxy-back" containerized cargo rail shipments.

Many Sizes and Types of Containers are Available

DEMPSTER-DINOSAUR standard containers come in 21 sizes ranging from 14½ feet to 23½ feet in length and 10 to 41 cu. yd. capacity. Special cargo containers up to 35 feet, tank-type and stake side models are also available. Drop-down telescopic legs to hold container at dock height are optional on some cargo containers.

Free Booklet Offered

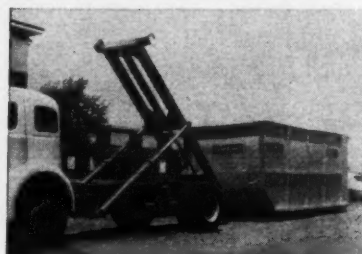
A free booklet which describes the operation of this new system in detail is offered by Dempster Brothers, the originator and only manufacturer of DEMPSTER-DUMPSTER Systems.

Mfd. By
DEMPSTER BROTHERS, Inc.

Dept. CP-2, Knoxville 17, Tenn.

Containerized Cargo, Waste & Raw Materials Handled by DINOSAUR

The newly developed DEMPSTER-DINOSAUR is a system of materials handling that employs giant containers up to 40 cubic yards and larger. It lends itself to any situation where bulk accumulations of raw materials, liquids, waste or finished products must be handled. Since one truck and one driver can automatically pick up, haul and dump or set down a number of containers, the DINOSAUR easily does the work of several trucks.



Dinosaur backs up to loaded container and engages it with lifting ball.



Container is hydraulically pulled up inclined tilting frame.



Container is pulled forward where it automatically locks into carrying position.



The Dinosaur hydraulically pushes a container off on a dock and inside a building for unloading.

Five-gal open-top pails filled, labeled, crimped by automatic machine

Only two men needed to run straight-line equipment

Uses: Packaging viscous materials — oils, adhesives, and paints — in 5-gal open-top pails.

Features: Machine operates on "no can, no fill" principle. Series of safety devices prevents spillage or overflow of containers. Cut-off is clean and leaves no drippage. Two men can operate machine. Production rate of 8 to 16 containers per minute can be attained with 2-4 nozzles.

Description: As container enters filling portion of machine, each of a series of air-operated nozzles deposits a partial quantity of material. One filling head has weight-controlled fill so that correct amount of liquid is utilized for end consumption.

When filling cycle is completed, container enters labeling area. This operation is activated by the container on the principle of "no container, no label." Label receives an overall glue pattern from roller.

The first stage of pressure applies label to pail, which then travels into wiping and pressure stations. Crimping station is next stop. Cover normally is placed on container manually, but it can be done automatically.

Crimping head operates in vertical motion, and is synchronized with rest of operation. As container arrives under crimping head, the head is automatically lowered onto container and crimps cover onto pail.

Unit is approximately 20 ft long, is self-contained to complete all operations. It is of straight-line intermittent-motion design, constructed with a double-strand 4½" stainless-steel chain conveyor with variable control.

(Automatic straight-line filling, labeling, and crimping machine is manufactured by MRM Company, Inc., 191-3 Berry St., Brooklyn 11, N.Y.)

Check 3803 opposite last page.

Check 3802 opposite last page

GAYLORD DEPENDABILITY KEEPS YOUR PRODUCTION ROLLING

You get a clear track to corrugated boxes when you signal Gaylord to start the run. In all lines of industry, Gaylord has a well earned reputation for delivering the packaging . . . so you can package and deliver the goods . . . on schedule.

Regular corrugated containers in big volume runs, or engineered packaging, give your G-Man the green light . . . keep production rolling profitably.



For more information on product at right, specify 3804 see information request blank opposite last page.



GAYLORD

CONTAINER CORPORATION



HEADQUARTERS, ST. LOUIS
PLANTS COAST TO COAST

DIVISION OF **Crown Zellerbach Corporation**



NO STORAGE PROBLEM!



TW GAS TRANSPORTS

NOW YOU CAN MOBILIZE YOUR GAS STORES! At surprisingly low initial cost, Taylor-Wharton Gas Transports enable you to plan bulk storage for optimum flexibility. Available in capacities of 38,500 to 56,600 cubic feet, these ruggedly built units utilize storage pressure vessels made under the same controlled production methods that have made Taylor-Wharton and Harrisburg hot-drawn seamless cylinders world famous.

Each modern Taylor-Wharton Gas Transport consists of normalized seamless steel pressure vessels, inspected and tested to I. C. C. 3A-2400 specifications. The vessels are rigidly grouped and mounted on a special trailer chassis with either single or tandem axle. The transport is delivered ready for use, with tubes manifolded to a common outlet in a rear-mounted weatherproof cabinet.

You can use this transport to boost your storage flexibility — to have your gas *where* you need it, *when* you need it. For complete details, request catalog 58 today.

More than a Century in Harrisburg 24, Pa.



HARRISBURG STEEL CO.

Division of HARSco CORPORATION



CYLINDERS



TUBES



FLANGES



COUPLINGS

Check 3805 opposite last page

MATERIAL HANDLING and PACKAGING



Wire-mesh conveyor belt in service at International Minerals

Bag breakage less with wire-mesh conveyor

**Maintenance costs cut 60%, while lost
production in making repairs to conveyor
is six times less than the old way**

GORDON WEYERMULLER, Associate Editor
with **T. L. HOLLAND**, Production Superintendent
International Minerals & Chemical Corporation
Tupelo, Mississippi

Problem: Excessive maintenance and lost production time occurred with slatted, chain conveyor belt formerly used for fertilizer bagging operation at International Minerals. Conveyor moved the bagged fertilizer from weighing unit to and through bag sewing machine.

Solution: In the fall of 1954 plant placed a Wissco wire-mesh conveyor belt in service. Belt is constructed of carbon steel thin spiral. Flat supporting surface prevents stretch and distortion. Welded knuckle-edge prevents edge wear and damage. Belt is 15" wide.

As shown in photograph, conveyor belt is driven across

smaller rollers by means of large pulley (left) covered with rubber belting. Rollers are mild steel which is softer than belt edge to decrease wear on belt. Belt is guided on bottom side about midway between ends.

Bag closing head is adjustable so it can be moved up or down to accommodate different size bags. Both 50-lb and 100-lb open-mouth multiwall bags are used. Production on 50-lb bags is 18/min and on 100-lb bags it is 16/min.

Results: Bag tearage and breakage has been less since the wire-mesh belt was installed. Maintenance cost on belt has been reduced 60%.

Total annual cost for conveyor parts, maintenance, and bag breakage has been cut 64% or to about one-third the previous cost. Less maintenance has lowered production time lost in making repairs to 1/6 what it was with belt previously in use.

Bag closer has given dependable service, has required practically no maintenance during the four years it has been in operation. Plant has four other bag closers of this type in use.

(Wissco belt is product of Wickwire Spencer Steel Div., the Colorado Fuel & Iron Corp., 575 Madison Ave., New York 22, New York.)

Check 3806 opposite last page.

(Style 80600 E bag closer is manufactured by Union Special Machine Co., 400 N. Franklin St., Chicago 10, Ill.)

Check 3807 opposite last page.

Heated trough liner plates permit efficient feeding of damp materials

Uses: For feeding bulk materials.

Features: Electrically heated trough liner plates facilitate efficient feeding of high-moisture-content bulk materials. Build-up of damp or wet materials in feeder trough is eliminated. There is no downtime for trough cleaning.

Description: Heavy-duty and extra-heavy-duty electromagnetic vibrating feeders are equipped with electrically heated trough liner plates.

Plates will most effectively handle various grades and types of sand, gravel, stone, ore, clay and other hard-to-feed bulk materials having moisture contents of 15-25%.

Liner plates are rated for continuous operation and can be easily adapted to controlled intermittent operation by means of moisture percentage timer.

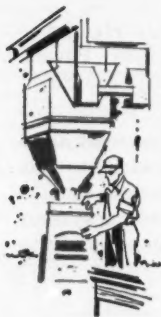
(Vibrating feeders with electrically heated trough liner plates are product of Syntrol Company, 110 Lexington Ave., Homer City, Pa.)

Check 3808 opposite last page.

Announcing the Revolutionary **Raymond Rotomatic Packer**



- Gravity Operated
- No electricity or compressed air
- Speed plus Accuracy
- Lowest Maintenance



SALES OFFICES

Middletown • Richmond • New York • Chicago • Minneapolis
Denver • St. Louis • Kansas City • Detroit • Charlotte • Memphis
Philadelphia • Baltimore • Houston
Cleveland • East Aurora, N.Y. • Louisville • Orlando

Here is the machine that is changing all standards for accurately weighing and packing free-flowing materials in open-mouth multi-wall bags!

The Raymond Rotomatic Packer is fully automatic, all-mechanical, and requires no outside source of

power such as electricity or compressed air. It combines gravity operation with the even balance scale principle that delivers simplicity of operation, accurate weights, and high rate of production.

Practical bagging rates are limited only by the operator's ability to feed bags to the filling tube. The Raymond Rotomatic Packer handles 50 lb. bags up to 100 lb. bags with equal ease. Bag size changes take less than 60 seconds and the first new size bag is correctly weighed.

Practical variances in material density do not affect the accuracy or operation of the Raymond Rotomatic Packer. The machine design limits material in suspension to a minimum, further im-

proving weight accuracy.

No specialists are required to maintain and service the Raymond Rotomatic Packer. Scale assembly can be adjusted by regular scale mechanics and any competent mechanic can service the unit.

Engineering, operation, and installation details are available from any Raymond Representative. For more details and information, write or call the Raymond Office nearest you.

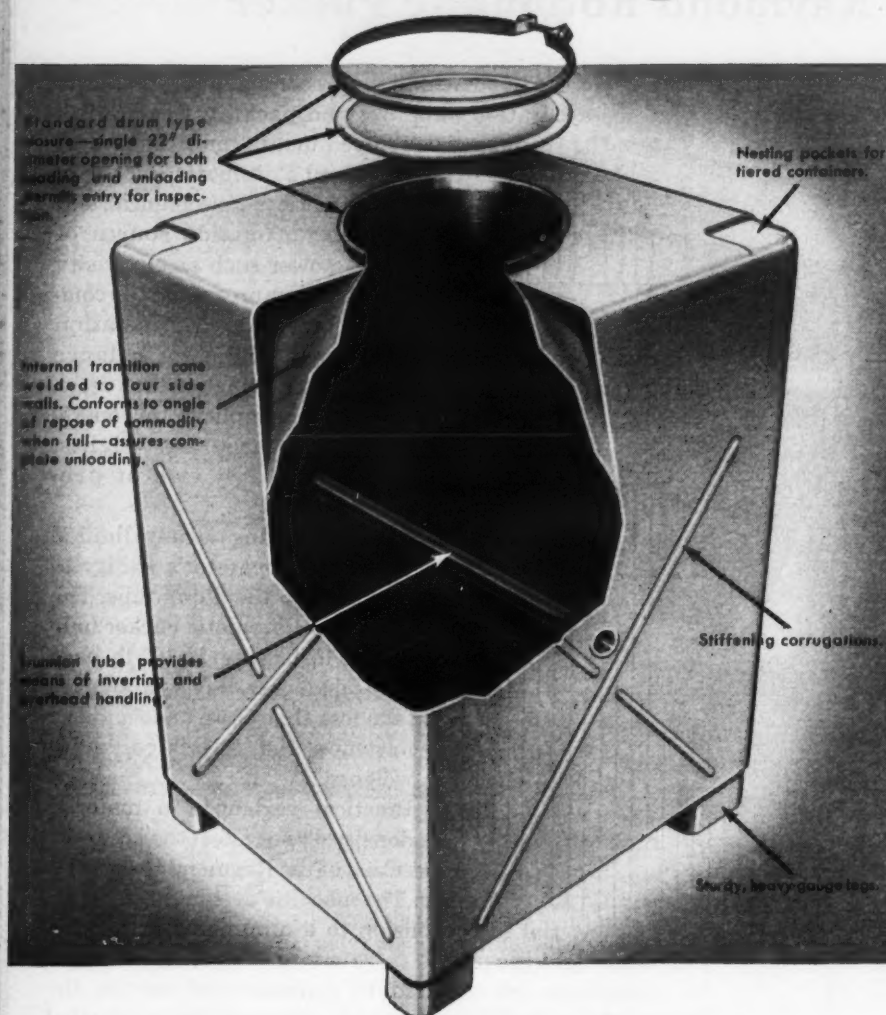
Raymond

BAG CORPORATION

a division of Albemarle Paper Mfg. Co.
Middletown, Ohio

Check 3809 opposite last page

New Powell **Invert-a-bin** slashes bulk handling costs

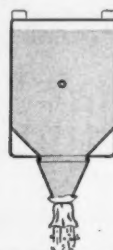


For bulk handling dry granular or powdered materials—sugar—flour—plastics—chemicals—cement—etc.—in plant or between plants, the new patented Powell Invert-A-Bin made of steel or aluminum is the simplest, most versatile container ever developed.

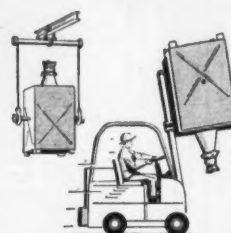
Easily filled, easily inverted, quickly emptied, the Invert-A-Bin can be used anywhere without special devices at each use point. It stores safely outside, lets you take advantage of many transportation economies. Invert-A-Bins eliminate the use of disposable packages and bring you all the advantages of a bulk handling system without the costly investment. Get all the facts—write today for your copy of the Invert-A-Bin, Semi-bulk handling brochure.



Fills Fast—22" opening permits fast filling of even powdered materials. Internal cone conforms to angle of repose.



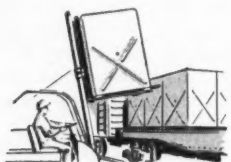
Empties Clean—Internal cone funnels all materials out of bin. No residue remaining.



Used Anywhere—Standard handling equipment—no fancy unloading devices needed at every use area.



Stores Outdoors—Weatherproof, turns yard area into warehouse. Stacks 2 high.



Cuts Shipping Costs—low cost flat-bed equipment considered part of special rail car with "freight free" advantages.

DATA SAVERS!

CP's Processing and Engineering Data Section is for you!

Each month, this section contains time-saving nomographs, tables, or charts which other data savers have found extremely useful in speeding calculations.

They have been sent to us by our many readers.

Perhaps, you will find them to be of value to you.

A wide variety of information can be found in this section. So, no matter what your particular field you will find suitable data to aid you in your daily work.

And —

the section pages are designed to fit easily into regular data files.

Keep them handy for use in making quick calculations in the plant or office.

Just cut along the marked edge, punch as indicated, and insert them into your notebook.

So —

be sure not to miss this month's "Data" Section. It begins on page 47.

For more information on product at left, specify 3810 see information request blank opposite last page.



THE POWELL PRESSED STEEL COMPANY

HUBBARD, OHIO

HANDLING & PACKAGING

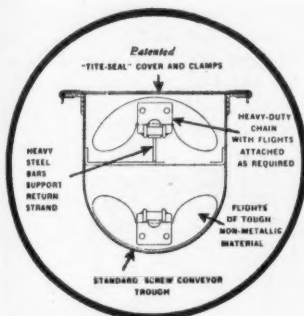
Many bulk materials conveyed quickly in compact unit

Uses: For conveying bulk materials.

Features: Unit will handle variety of abrasive or non-abrasive materials without requiring separate return strands. It is self-cleaning, compact, and fast.

Description: Conveyor consists of a series of flights carried by chain fitted with attachments, all enclosed and operating within a conventional screw conveyor trough. Any convenient type of drive can be used.

Deep loads can be carried either horizontally or on any incline. Shape of flights fits



Compact, self-cleaning conveyor handles variety of bulk materials

contour of trough, providing positive wiping and cleaning action. Flights are constructed of special tough, non-metallic material, assuring smooth, quiet operation.

Return strands of conveyor are supported by special iron guide carried on cross steel supports entirely within trough. Discharge from trough may be at any point desired. Receiving spouts can be located to suit conditions.

("Hy-Flo" conveyor is product of Screw Conveyor Corporation, 700 Hoffman St., Hammond, Ind.)

Check 3811 opposite last page.

Corrugated belts, non-porous and non-marking, for handling wet, sticky materials are detailed in two-page Data Sheet 2470—B. F. Goodrich Co., Akron, Ohio.

Check 3812 opposite last page.

No bills for bags, drums, containers



Easier, safer loading and unloading



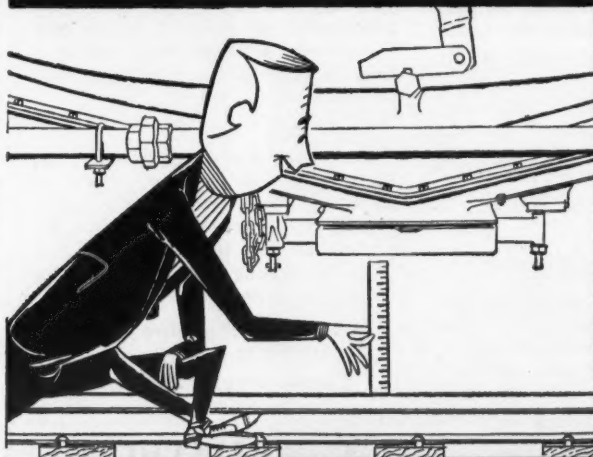
No sanitation problems in transit



No packing, racking or stacking



Far more clearance for unloading



Bulk shipping of dry, granular and powdered products in General American Airslide® Cars is safer, easier—and costs less!



Over 3000 Airslide Cars now in service or on order. A blower is all you need to unload cars into any conveying system. Write for bulk shipping information on your products.



**GENERAL AMERICAN
TRANSPORTATION CORPORATION**
135 South La Salle Street, Chicago 90, Illinois

AIRSLIDE CARS are successfully shipping flour, semolina, sugar, starch, plastics, chemicals and other products.

Check 3813 opposite last page

How Much Steam Should a Steam Trap Trap?

... some answers to commonly asked questions about the primary job of a steam trap

You don't need a doctor's degree in thermodynamics to answer the question at the top of this page. Naturally, a steam trap should trap *all* the steam.

Unfortunately for you, the problem isn't quite that simple. After all, a shut off valve would trap all the steam . . . and condensate, and air, and carbon dioxide as well.

So we'd better amend the answer to the question this way: A steam trap should trap *all* the steam but *must* remove condensate, air and carbon dioxide as rapidly as they accumulate.

With this established, let's take a closer look at what's involved:

A Steam Trap Should Trap All The Steam

If you've had experience with several different makes of traps, you already know that some trap steam better than others. The operating principle of the trap is what makes the difference. We like to talk about it because Armstrong traps are designed so that no steam can get to the orifice. The valve is always water sealed. Result: *More efficient steam utilization, lower fuel costs.*

A Steam Trap Should Remove Condensate

All traps remove condensate—after a fashion. For maximum efficiency in the unit being drained, though, the trick is to get it out without waiting for it to cool and without leaking steam.

Armstrong's water sealed valve takes care of steam leakage. The inverted bucket operating principle opens the trap for water regardless of its temperature. This means you get the condensate out as quickly as it accumulates. Result: *Higher temperatures and better heat transfer in steam heated units.*

A Steam Trap Should Remove Air and CO₂

Part and parcel of the condensate removal problem is removal of air as well as oxygen and carbon dioxide—two real troublemakers. Air tends to reduce operating temperatures and interfere with heat transfer. CO₂ goes into solution to form

corrosive carbonic acid which, for example, can eat unit heater tubes. O₂ aggravates the situation. Believe it or not, but all traps don't properly remove air and CO₂.

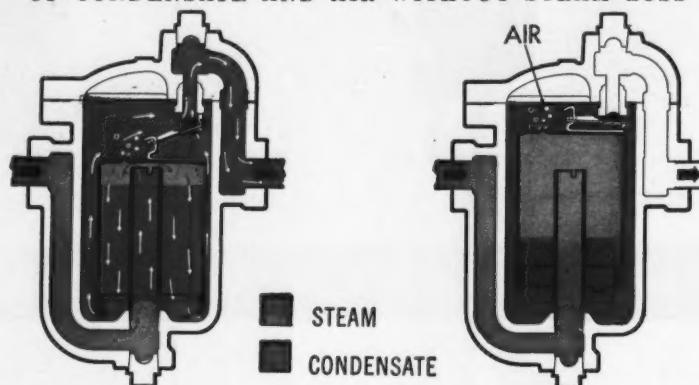
By now, you've probably guessed that Armstrong traps *do* remove air and CO₂. Armstrong design (see illustration) provides continuous venting of air and CO₂. By opening suddenly, the Armstrong trap creates a momentary pressure drop to "pump" the air down to be vented. Result: *Higher temperatures, faster heat-up, better heat transfer and reduced corrosion.*

Note: When required, specially sized air vents are furnished. For fast heat-up of low pressure on-and-off units, Armstrong provides open float and thermostatic air vent traps.

What's the Final Answer?

Summing it all up, you'll get the best service from steam heated units that are equipped with traps designed to trap *all* the steam and remove air and condensate as quickly as it accumulates. In our prejudiced viewpoint, this means Armstrong traps. More important are the several thousand users of Armstrong traps who have proved the point.

HERE'S THE STEAM TRAP DESIGN THAT GETS RID OF CONDENSATE AND AIR WITHOUT STEAM LOSS



Trap open. Condensate entering trap has caused bucket to lose buoyancy. Weight of bucket times leverage pulls valve open. Air is discharged along with condensate.

Trap closed. Steam has floated inverted bucket; valve is held tightly closed by system pressure. Air entering trap passes through bucket vent and accumulates at top of trap.

Before you make up your mind, though, consider the minimum maintenance requirements of Armstrong traps . . . and the convenient assistance your local Armstrong Representative provides. These are important plus values.

Put Up or Shut Up

We're so confident that we "put up". Armstrong traps are unconditionally guaranteed to satisfy. So you can find out for yourself with practically no risk. If you're not completely satisfied with the way they do their job, you can get your money back.

* * *

The 44-page Armstrong Steam Trap book goes into greater detail on these and other Armstrong features. It also discusses trap selection, installation and maintenance. Ask your Armstrong Representative for a copy or write

Armstrong Machine Works
8805 Maple Street
Three Rivers, Michigan



**ARMSTRONG
STEAM TRAPS**

HANDLING & PACKAGING

Visual balance indicator permits on-spot check of weighing errors

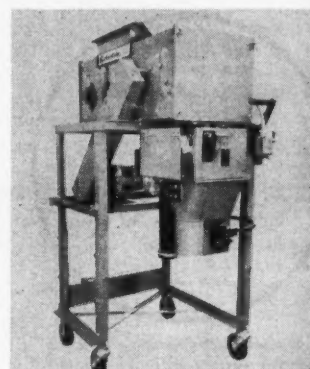
Indication is rapid, accurate, and stable

Uses: Unit was developed to meet needs of small plants for inexpensive one-man bagger.

Features: Eye-level visual balance indicator permits on-the-spot elimination of weighing errors.

Description: Gross bagging scale, with feeder, bags non-free-flowing materials at low initial and low operating costs.

Designed for use with open-mouth textile and multiwall paper bags, bagging scale provides accurate filling of 10- to 140-lb bags. Indicator operates



Provides accurate filling of 10- to 140-lb bags

on torsion principle so that indication is rapid, accurate, and stable.

Bag is slipped on an oval spout and is held in position by bag holder. Operator pulls gate handle, which opens scale inlet gate and starts belt feeder. When weigh beam comes to balance, scale inlet gate closes and feeder stops. Visual balance indicator shows true balance.

Compensation arrangement automatically cuts off scale at accurate weight. Slide attachment permits serving many spouts, and scale is easily detached from feeder.

(GA-17 gross bagging scale with feeder is product of the Richardson Scale Co., Van Houten Ave., Clinton, N. J.)

Check 3815 opposite last page.

Check 3814 opposite last page

Here's customer service in action . . . where an equipment manufacturer worked side-by-side with a chemical company through lab tests, sales development, to production. Result? An economical process for making . . .

Powdered Polyethylene by Spray-cooling

DANA B. BERG, Managing Editor
with **A. J. KOEHNE**
Plant Superintendent
Semet-Solvay Petrochemical Division
Allied Chemical Corporation
Tonawanda, New York

Problem: The Semet-Solvay Petrochemical Division of Allied Chemical Corporation needed a more economical, higher capacity, continuous process for making powdered low-molecular-weight polyethylene. Company had a

waiting market for the powdered form because of its faster melting and mixing characteristics — of particular advantage in wax blending, injection molding of polyethylene, paper coating, rubber process lubrication, and ink and paint formulation.

Grinding of pellet polyethylene being produced at company's Tonawanda, N.Y., plant was out of the question. Material's physical properties would not permit it.

Solution: Semet-Solvay

took the problem to Bufllovak Equipment Division of Blaw-Knox Company, Buffalo. Test runs by Bufllovak's customer-service laboratory, based on Semet-Solvay experience with their original plant-constructed apparatus for low-capacity batch atomizing of polyethylene, indicated that molten low-molecular-weight polyethylene could be spray-cooled at high production rates, with improved physical characteristics.

Semet-Solvay authorized the lab to scale-up the tests for product sales evaluation and design data. In fact, Bufllovak spray-cooled over 50 tons of the polyethylene to meet the increasing market demands for the product, before Semet-Solvay could get increased production rolling in their plant. While all this was going on, Bufllovak was designing and building the spray-cooling equipment for

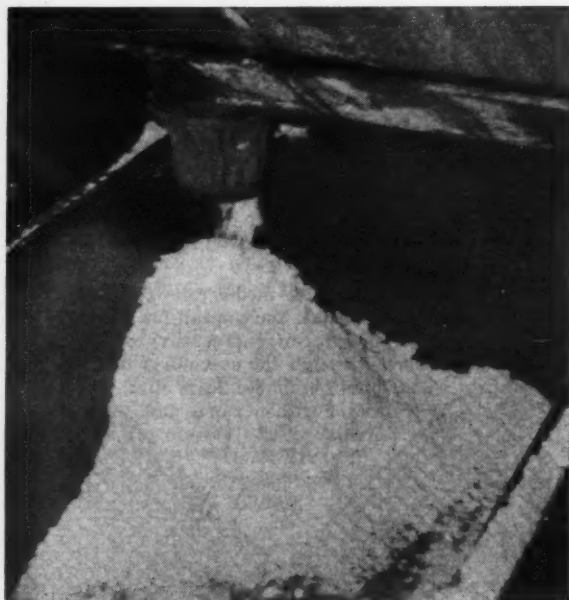
Semet-Solvay's Tonawanda plant.

Production Unit

In production, spray-cooling is done in a 6'-diam, 15'-long, horizontal, single-shell chamber of irregular cross-sectional design. Cooler and full-length conveyor screw along its bottom are stainless steel. Capacity is 500 lb/hr.

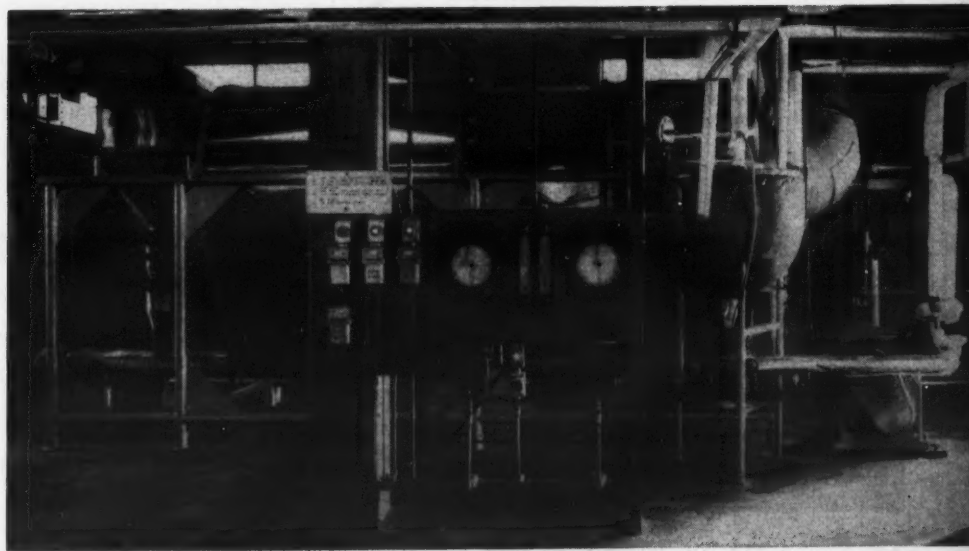
Molten polyethylene (at 300°F, 0.92 sp gr, 18 cps) is forced through two spray nozzles in end of chamber by a Manton-Gaulin Triplex pump developing a pressure of 2000 psi. Pump was designed with cored cylinder to take 150-psi steam, which keeps cylinder temperature at about 300°F. Pump cylinder and wettable parts are stainless steel.

As molten polyethylene sprays into chamber, it is atomized in a stream of cooling



Powdered polyethylene coming from spray cooler during pre-plant runs at Bufllovak's customer-service labs

Compact spray-cooler installation at Semet-Solvay Petrochemical Division plant at Tonawanda, N. Y. Pump at far right forces molten polyethylene into horizontal cooling chamber through two atomizing nozzles. Powdered product leaves chamber via built-in screw conveyor extending full length of chamber and outward to far left



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Canada. Houston Branch Plant, 1121 Rothwell St., Sect. 15, Houston, Texas

Check 3816 opposite last page

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Check 3817 opposite last page

PROCESSING EQUIPMENT

air being pulled from outside
the plant and, in turn, through
chamber and multi-cyclone
12-tube dust collector at 2000
cfm. Solid powder particles
form almost immediately and
fall to bottom where built-in
screw conveyor takes them
out of chamber and to pack-
aging operations. Any mate-
rial that is airborne in exhaust
air stream is trapped in col-
lector and continuously
blended with chamber dis-
charge.

Bulk density of the powder
is about 27 lb/cu ft; average
molecular weight, 2000; melt-
ing point, 219-226°F. Typical
screen analysis of low-molec-
ular-weight A-C Polyethyl-
ene 6A is:

Retained on	20 mesh	0.1%
"	40 "	1.4%
"	60 "	18.3%
"	100 "	39.2%
Through	100 "	41.0%
		100.00%

Results: Spray-cooling
technique has proved eco-
nomical way of producing
controlled powdered poly-
ethylene. New equipment pro-
vided 10-fold increase in pro-
duction capacity with little or
no increase in floor space re-
quired. Performance of equip-
ment is excellent.

(Horizontal spray-cooler is
product of Buflovak Equip-
ment Division, Blaw-Knox
Company, PO Box 2041, Buf-
falo 11, N.Y.)

Check 3818 opposite last page.

(Model 100-HP-KL3-5BAX
Triplex pump was made by
Manton-Gaulin Mfg. Co., Inc.,
44 Garden St., Everett 49,
Massachusetts.)

Check 3819 opposite last page.

Minimum maintenance on improved design attrition mills

Uses: Grinding various ma-
terials in chemical and al-
lied industries.

Features: Mill's versatility
is limited only by size of in-
itial material. Product can be
ground fine enough to pass
through 250 mesh screen.

Redesigned unit eliminates

for uniform results

*in... BAKING
DRYING
CURING
DEHYDRATING*

select

YOUNG BROTHERS OVENS and DRYERS

*designed and built
for individual product
and process requirements*

Batch and Conveyor Types up to 1000° F
Gas, Electric, Steam, Oil — Radio Frequency Power

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Over 60 years of service



Check 3820 opposite last page

**Must
a chemical
engineer be a
filter fabric expert, too?**

Selecting the right filter media calls for detailed,
specialized knowledge. You can call for this help
—and the benefits of our century of ex-
perience—through the specialists who
distribute Wellington Sears filter
fabrics. For their names and
free copy of "Filter
Fabric Facts,"
write Dept.
M-2.



Wellington Sears Company

111 West 40th Street, New York 18, N. Y.

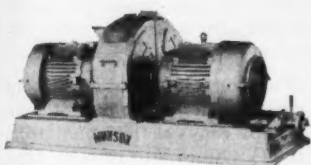
Atlanta • Boston • Chicago • Dallas • Detroit
Los Angeles • Philadelphia • San Francisco • St. Louis
Check 3821 opposite last page

CHEMICAL PROCESSING

PROCESSING EQUIPMENT

need of convention bearings stands. Motors are furnished with oversize extra-capacity bearings and are designed to permit direct mounting of discs on motor shaft. Bearing maintenance is reduced to minimum.

Description: Ball bearing attrition mills are made for hard and rugged service. Improved design permits overall length of mill to be shortened considerably, thereby adding to its strength and rigidity.



Compact mill is designed for hard, rugged service

Unit is constructed of one-piece gray iron casting. Adjusting end of mill slides out for inspection of interior and change of plates. Slide does not disturb alignment of shaft or bearings.

Bed casting contains integrally cast discharge spout. Design of spout permits free flow of ground material and affords convenient connection to conveying equipment.

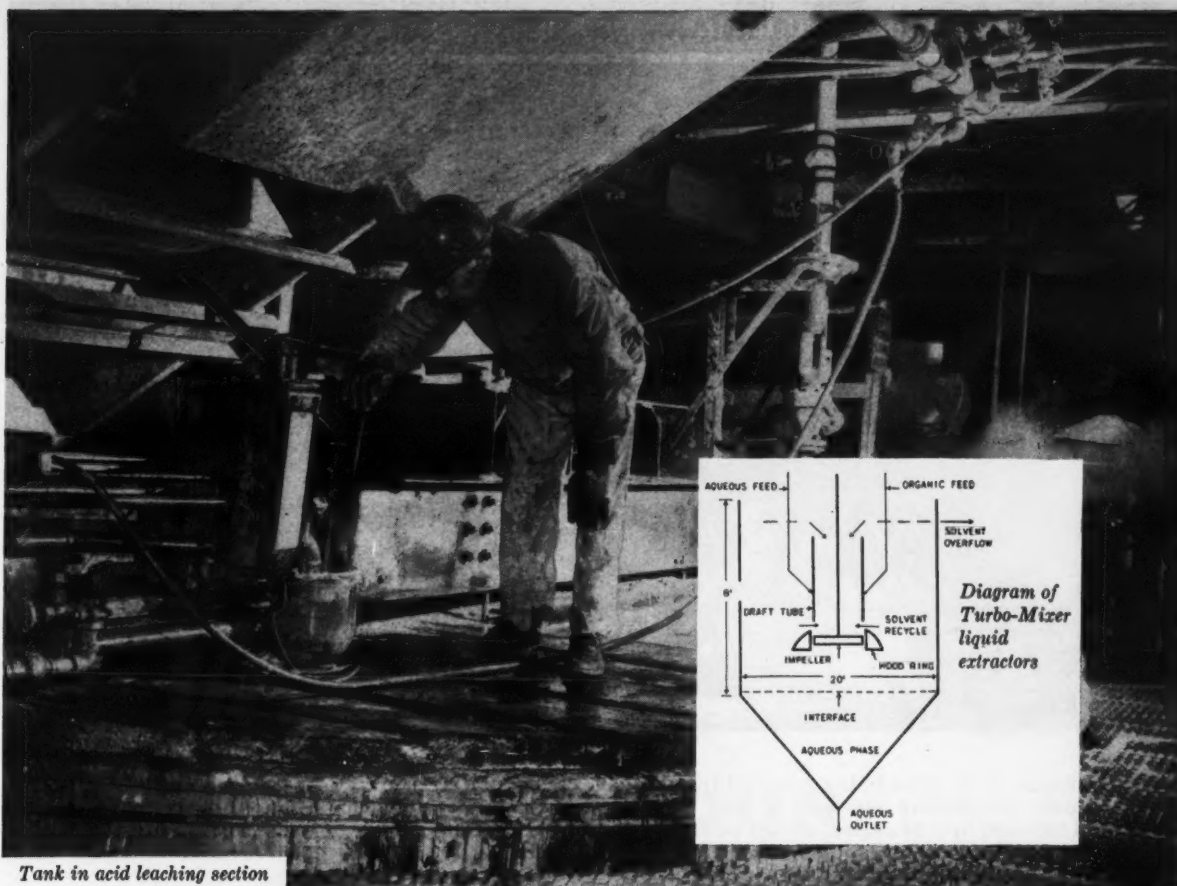
Discs and shafts are machined to close tolerances and are precision balanced for vibration-free operation. Seal rings are bolted to the case and encircle neck of grinding discs. Rings are easy to replace.

Adjustments from fine to coarse grinding can be quickly made by use of hand wheel. Changes can be made even while machine is in operation. Grinding plates, or burrs, are made of special composition metal. Plates are ground on face and back and are balanced to assure constant, uniform grinding.

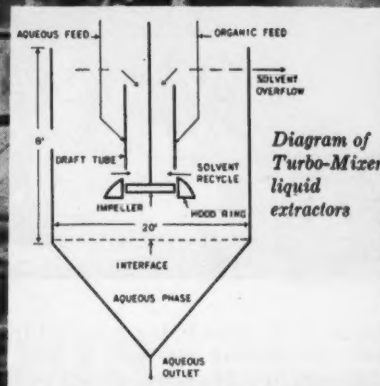
Two types of mills are available; the totally-enclosed, fan-cooled; and the open, general purpose unit.

(Ball bearing attrition mills are product of Munson Mill Machinery Co., Utica, New York.)

Check 3822 opposite last page.



Tank in acid leaching section



VITRO URANIUM HANDLES A WIDE VARIETY OF URANIUM MINERALS WITH TURBO ON THE JOB

When VITRO URANIUM COMPANY of Salt Lake City embarked on a modernization program, they called on GENERAL AMERICAN to assist in the design of the most modern mill possible.

Heart of the plant is the extraction system, and here, GENERAL AMERICAN Turbo-Mixers proved to be key equipment, in both the leaching and liquid extraction sections.

VITRO URANIUM processes a wide variety of uranium minerals which require highly versa-

tile extraction equipment. GENERAL AMERICAN Turbo-Mixers fit this requirement, replacing an outmoded phosphate precipitation operation. Recoveries of uranium fed into the system are "excellent."

As a result of VITRO's million and a half dollar modernization program, the 660 ton/day mill already has significantly reduced operating costs. Further proof that in processing as in transportation and storage, it pays to plan with GENERAL AMERICAN.

FOR DETAILED INFORMATION AND USEFUL DESIGN DATA, SEND FOR THE FOLLOWING BULLETINS:

Please send me the following Turbo-Mixer Bulletin (s) :

General Turbo-Mixer Bulletin_____

RDC Extraction Column Bulletin_____

Side Entering Propeller Mixer Bulletin_____

Absorption & Oxidation Bulletins_____

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Check 3823 opposite last page.

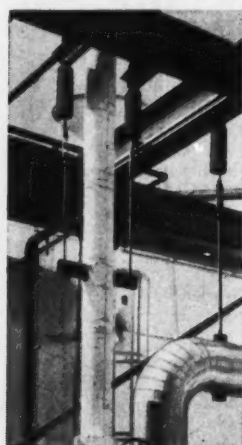
BLAW-KNOX has what it takes—to provide these products and services



Large chrome moly pipe being readied for shipment to new generating station. Making a right angle bend followed by a 24 degree, 18 foot bend in this heavy 27½ inch chrome moly pipe required all the skill and modern facilities of the Blaw-Knox power piping shop. Before shipment, piping is heat-treated and ultrasonically tested with a radar-type device for detection of any defects.

A new Blaw-Knox "6 x 6" Flexibility Matrix Method

of computing stresses in power piping systems is now available to consulting engineers, companies, and individuals responsible for the design of power piping systems. By the use of an electronic computer this method cuts calculating time from months to a day; assures full accuracy to six significant figures; and has no limitations on the complexity of the system. Write for further information about our new "6 x 6" Flexibility Matrix Method.



Two-way control over movement of piping is provided by Blaw-Knox functional spring hangers with the patented internal swivel action—shown in this modern outdoor generating station. Our experienced engineers are available to both design and make recommendations for your hanger requirements. To get full information, write for Catalog No. 54.

Each year serious fire strikes one out of every seven manufacturing firms in this country. Be safe. Let a Blaw-Knox fire-protection engineer study your needs—and explain how you can pay for the system on our lease or deferred payment plan. To get more information send for Bulletin No. 2426—"Fire Can Destroy Your Business."



BLAW-KNOX COMPANY

Power Piping and Sprinkler Division
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Complete facilities for prefabrication and erection of piping systems for all pressures and temperatures
... complete line of standard and custom-engineered pipe hangers, supports and vibration eliminators
... complete line of automatic sprinkler systems for standard and special hazards

Check 3824 opposite last page

PROCESSING EQUIPMENT

Booster vacuum pumps handle large volumes in 10 μ to 1 mm range

Uses: Producing vacuums.

Features: Pumps are capable of handling large volume pumping loads in 10 microns to 1 millimeter range.

Description: Series of mechanical booster vacuum pumps are available having maximum pumping speeds of 1050, 1250, 2900, and 5100 cfm respectively, and an ultimate vacuum of ½ micron. Larger units, having capacities up to 10,000 cfm are also under development.

(Further information about mechanical booster vacuum pumps may be obtained from the Vacuum Equipment Div., F. J. Stokes Corp., 5500 Tabor Rd., Philadelphia 20, Pa.)

Check 3825 opposite last page.

Compact, portable filter has pump magnetically operated by motor

Two models conservatively rated at 100 to 300 gph

Uses: For filtering expensive, sensitive, hazardous, and critical solutions.

Features: Portable filter has pump which is inside motor housing and magnetically driven by motor. Stuffing boxes, rotary seals, shaft wear, coupling, and alignment problems are eliminated, resulting in leak-proof, maintenance-free operation.

Description: Pump parts are fabricated of corrosion-resistant stainless steel. A 316-stainless steel liner isolates motor windings from pumping chamber. Pump is driven by ¼ hp totally-enclosed 110 v, 60 cy., one phase motor supplied with thermal starting and overload relay.

Model LEI-10 is conservatively rated at 100-150 gph, while rating of Model LEI-20 is 200-300 gph. Pump will de-



PROCESSING EQUIPMENT

liver 1300 gph on open pumping. Pinch valve located after filter chamber throttles high flow. Motor is not affected by throttling; it simply does less work when pumping less liquid.

Each unit is 6½ inches in diameter, 23 and 33 inches (including portable handle) high, and weighs 38 and 45 lb, respectively.

Also available for filtering operations up to 1800 gph are models with ¾ hp motors and multiple unit filter tube chambers containing three, four, six, eight, and 12 filter tubes.

(Portable filters are manufactured by Sethco Manufacturing Co., 2284 Babylon Turnpike, Merrick, N.Y.)

Check 3826 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

Holes, 0.003" diam produced mechanically for screen use

Recently developed fabricating process makes possible, by mechanical means, perforation of extremely small holes in many types of sheet metal, including stainless steel and aluminum. Openings as small as 0.003" diam in 0.020"-thick stainless steel on very close and uniformly spaced centers are available. Holes are tapered to minimize blinding.

(Further information about screens may be obtained from Pyramid Screen Corporation, 181 Harvard Street, Brookline 46, Boston, Massachusetts.)

Check 3827 opposite last page.

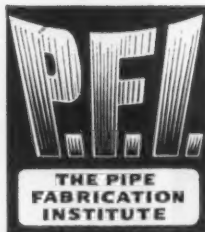
Plate and sheet metal fabricator's facilities and products are illustrated and described in 16-page bulletin that also discusses services. Facilities and Services Bul—Littleford Bros., Inc., 453 East Pearl St., Cincinnati 2, Ohio.

Check 3828 opposite last page.



"ALL I WANT IS YOUR P.F.I. Standards"

- 1 Machining Backing Rings for Butt Welds
- 2 Dimensioning Welded Assemblies
- 3 Linear Tolerances Bending Radii
- 4 Shop Hydrostatic Testing
- 5 Cleaning Fabricated Piping
- 6 Built-up Weld, Metal Bosses
- 7 Welded Nozzles—Spacing
- 8 Preheat-Postheat Before, After Welding
- 9 Arc-Welding Dissimilar Ferritic Steels
- 10 Stress Relieving Practices



Sure, it's a crime to hold someone up for something valuable. But, it's no crime to want a complete file of P.F.I. Standards compiled and published by the Engineering Standards and Metallurgical Committees.

While these Standards are packed with vital data on the design, fabrication and erection of industrial and high pressure—high temperature piping, they do not explain the many advantages of shop fabrication. Shop fabrication by firms responsible for the development of P.F.I. Standards is your real assurance of meeting the most exacting requirements of piping, whether it's welded, bent, coiled or vanstoned... in any metal as a component or a complete assembly.

Write for all ten P.F.I. Standards or indicate in the coupon below which ones could be helpful to you.

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Please send me the P.F.I. Standards indicated

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Check 3829 opposite last page



Who cares about your Wire Cloth Fabrications?

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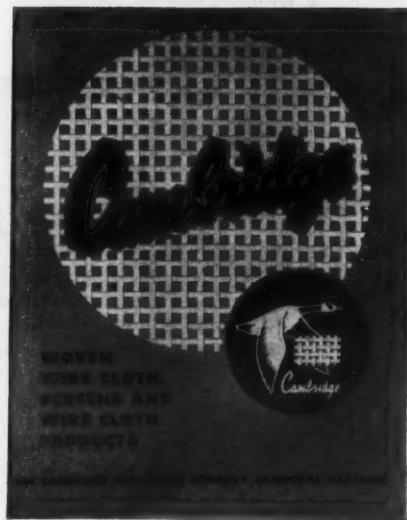
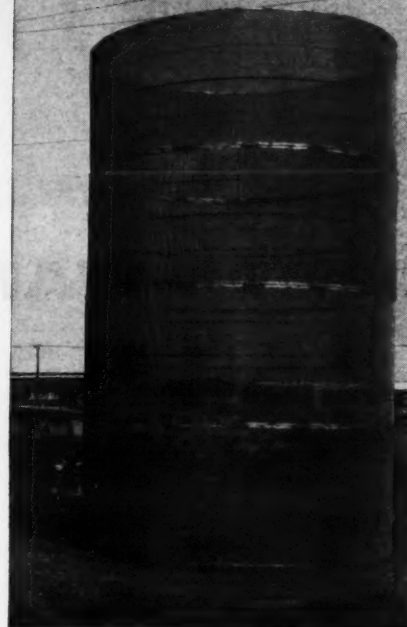
that's why you automatically get service with your order . . . whether you need dozens of midget strainers or a single giant-sized retaining screen.

Careful, competent workmanship and constant inspection assure you of quality . . . modern machinery and accurate scheduling assure you of prompt delivery. And, a Cambridge Field Engineer follows up your order to make sure our product is giving you the best possible service. Let us quote on your next order for wire cloth fabrications. We manufacture wire cloth from any metal or alloy—including titanium—in nine basic weaves. We'll work from your prints or draw up prints for your approval. Call your Cambridge Field Engineer . . . he's listed in the yellow pages under "Wire Cloth". Or, write for FREE 94-PAGE CATALOG.

The Cambridge Wire Cloth Co.

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Manufacturers of Wire Cloth,
Metal-Mesh Conveyor Belts, Wire Cloth Fabrications



PROCESSING EQUIPMENT

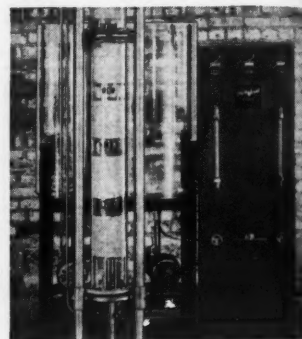
Up to 20 gal per minute processed by low-cost extraction plant

Packaged unit comes with manual or automatic controls

Uses: Conducting solvent extractions in pilot plants are small-scale production.

Features: Extraction plant comes as a completely packaged unit ready for operation within a few hours after arrival. Units have low initial cost and are available in capacities ranging from 20 cc to 20 gallons per minute.

Description: Equipment consists of a gravity-type column equipped with efficient impeller mixing sections. Sections are assembled on a ro-



Compact solvent extraction column is flexible, can have up to 10 or more stages

tating shaft controlled by a variable-speed drive unit.

Clarification sections are packed with coalescing materials necessary for phase disengagement. Sufficient mixing and clarifying sections can be combined in a single unit to provide as many as 10 or more stages. Plant can be fitted with either manual or automatic controls.

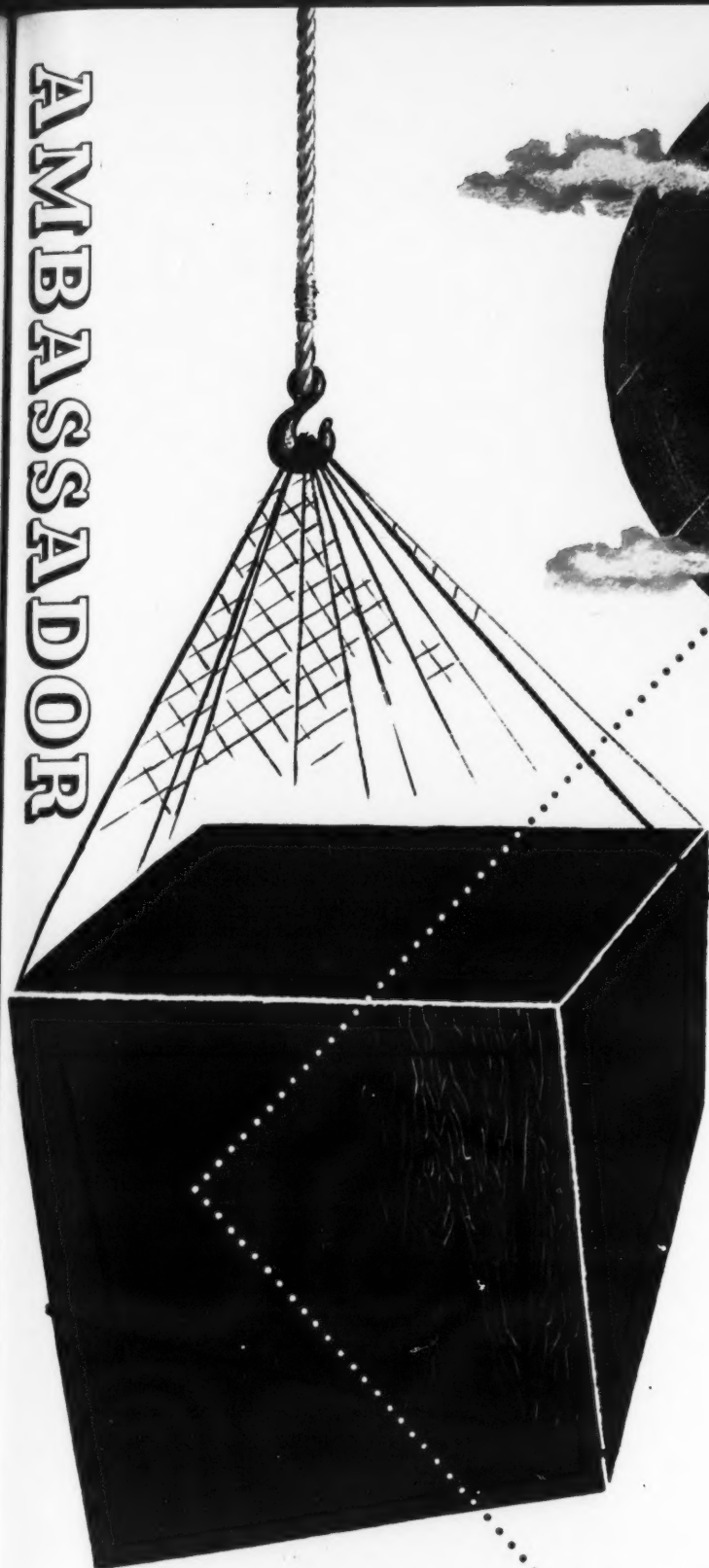
(Spiradyne column extraction plants are product of Podbielniak, Inc., 341 East Ohio Street, Chicago 11, Illinois.)

Check 3831 opposite last page.

For more information on product at right, specify 3832 . . . see information request blank opposite last page.

Check 3830 opposite last page

AMBASSADOR



REPRESENTATIVE OF AMERICAN INDUSTRIAL KNOW-HOW...

bound for ports around the world, Mikro grinding, conveying and dust recovery units are being shipped daily to wherever there are products to be processed. From Canada to Australia to South Africa, engineers and industry officials—like so many of their counterparts here at home—have learned to expect maximum results from Mikro products. Our list of "Orders Completed" includes everything from pilot plants to complete closed-circuit processing systems . . . which is another way of saying that there is a Mikro unit for your particular requirements, large or small. Want to learn more about Mikro products? We'll be glad to send you the information without obligation.

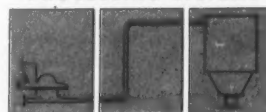
Genuine Mikro replacement parts are shipped to any point within 48 hours of order.

MIKRO-Products

Pulverizing Machinery Division • Metals Disintegrating Company, Inc.
85 Chatham Road • Summit, New Jersey



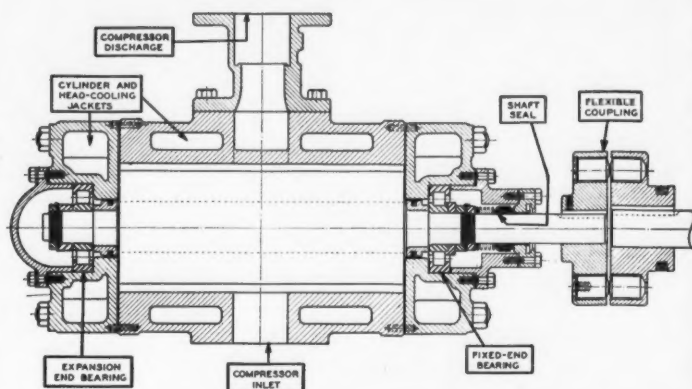
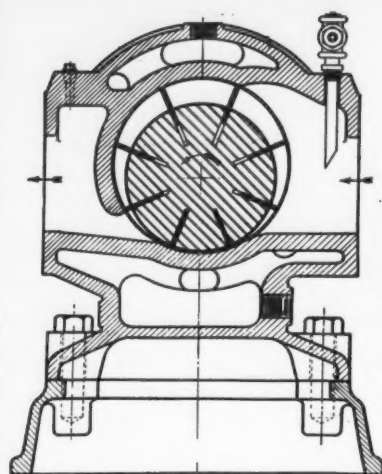
PROCESSING SYSTEMS



GRINDING . . . CONVEYING . . . COLLECTING

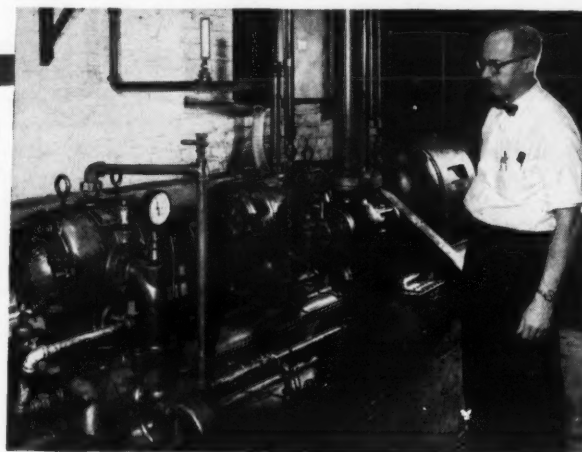
REPRESENTATIVES throughout the United States, Continental Europe, British Isles, Canada, Mexico, Central and South America, West Indies, South Africa, India, Japan, Philippines, Australia and New Zealand.

MANUFACTURING FACILITIES: United States, Canada, Continental Europe, British Isles.



Hard service never affected this Fuller rotary's original output—230 cfm. of air at 90 lb. G., reports Mr. Schott, chief engineer, Thomas C. Wilson, Inc., Long Island City, N.Y.

FULLER ROTARY COMPRESSOR RUNS 13 YEARS WITHOUT DOWNTIME



A Fuller rotary at Thomas C. Wilson, Inc. got its first maintenance shutdown recently, for renewal of roller bearings and rotor vanes—after running without downtime since 1945.

4 years of 24-hour service. The Wilson plant makes tube cleaning equipment, tube expanders and portable pneumatic tools, and so makes heavy daily demands on shop air. For the first four years, three-shift operation kept the Fuller rotary running round the clock. Since 1949, it's been working eight-hour shifts. **Simple design means trouble-free service.** Besides

bearings, the only moving parts in a Fuller vane-type rotary compressor are the cylindrical rotor and the blades. These compensate for wear automatically. Cylinder head slips off, permitting blade and bearing inspection in a matter of minutes.

Compact and vibration-free. Direct-drive system saves space. Simple, rugged design gives constant service without extensive supervision. Thus, Fuller rotaries can be installed out-of-the-way—on upper floor, on balconies, in basement corners, using low-cost, light-weight foundations.

1189
C-340

Write today for detailed information on the full line of Fuller rotary compressors for in-plant services, gas gathering, and industrial refrigeration.



FULLER COMPANY

136 Bridge St., Catasauqua, Pa.

SUBSIDIARY OF GENERAL AMERICAN TRANSPORTATION CORPORATION
Birmingham • Chicago • Kansas City • Los Angeles • New York • San Francisco • Seattle

Fuller

pioneers in harnessing AIR

PIONEERS OF HIGH-EFFICIENCY VANE TYPE ROTARY COMPRESSORS SINCE 1930

Check 3833 opposite last page

PROCESSING EQUIPMENT

**Process heat-sensitives,
viscous, foamy materials
easily with thin-film unit**

Short contact time permits
use of high temperatures

Uses: Concentrating wide
variety of viscous, foamy, or
heat-sensitive materials.

Features: Machine's turbu-
lent thin-film action and con-
trolled contact time between
product and heating medium,
result in high heat transfer
rates which are easily regu-
lated to suit requirements of
the product.

Description: Equipment
consists essentially of a jack-
eted, vertical vaporization
tube discharging into a cen-
trifugal liquor-vapor separa-
tor. A spinning rotor in the
tube agitates the down-flow-
ing, thin film of liquid into a
violent turbulent action.

Rotor blades are fitted to
wipe tube wall within small
fraction of an inch throughout
entire length of rotor.

Because of extremely short
contact time between product
and heating surface, relatively
high-temperatures can be
used. Burn-on, and localized
encrustation due to overheating,
are avoided because every
particle of product on heating
surface is in constant turbu-
lent motion.

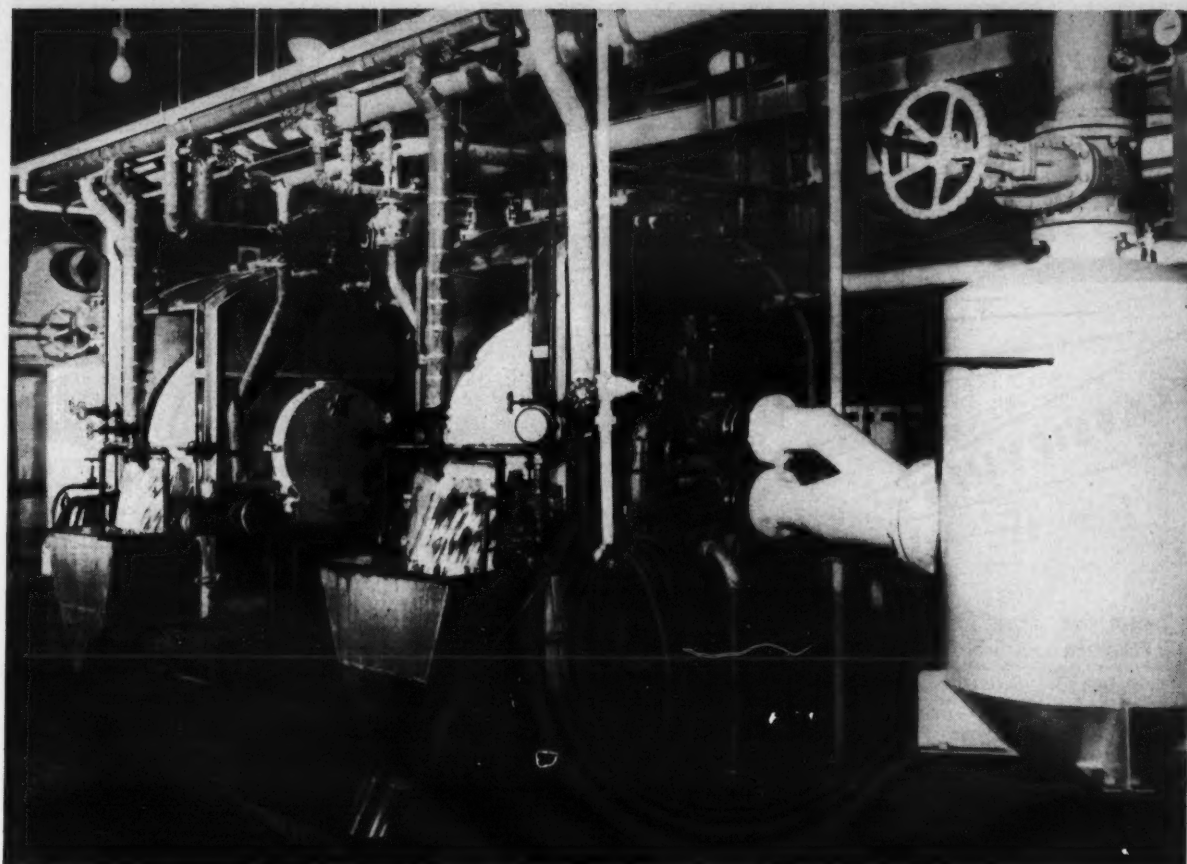
Liquor and vapor pass ver-
tically down vaporization
tube. There is no possibility of
entrainment re-run, or reflux
of product, and subsequent
deterioration of properties due
to overheating.

Observation glasses, vacuum
controls, and a sampler con-
nection provide for efficient
control. Quick-opening man-
holes give easy access to bear-
ings, packing glands, and seals
for maintenance.

Units are available in differ-
ent sizes. Various materials of
construction can be used, de-
pending upon product being
processed.

(Agitated-film ROTO-
VAK evaporators are product of
Buflovak Equipment Division,
Blaw-Knox Company, P.O.
Box 2041, Buffalo 5, New
York.)

Check 3834 opposite last page.



HOW IMPORTANT IS THE FILTER STATION IN YOUR FLOW SHEET?

If the filtration needs in your plant can be met
by any filter of a given size, then you may want to
buy with price as the only consideration.

But, if you want a filter designed to give the
highest efficiency in meeting the requirements of
your flow sheet, then Eimco's long experience and
facilities will give you the plus value when your filter
needs are studied and researched from the standpoint
of such typical features as the hydraulics of liquid
flow, pressure drops, washing and drying efficiency,

capacity sizing, filter media selection and many other
features which make filter selection a science.

This picture shows an Eimco Engineered filter
station in a highly successful chemical plant. It is
the result of customer engineering and Eimco engi-
neering cooperation based on all of the features listed
above.

Let Eimco help you with your liquid-solids separa-
tion problems through filtration, sedimentation or
clarification.

THE EIMCO CORPORATION

SALT LAKE CITY, UTAH

Research and Development Division, Palatine, Illinois

Export Office: Eimco Building, 51-52 South Street, New York 5, N. Y.

Process Engineers Inc. Division, San Mateo, California

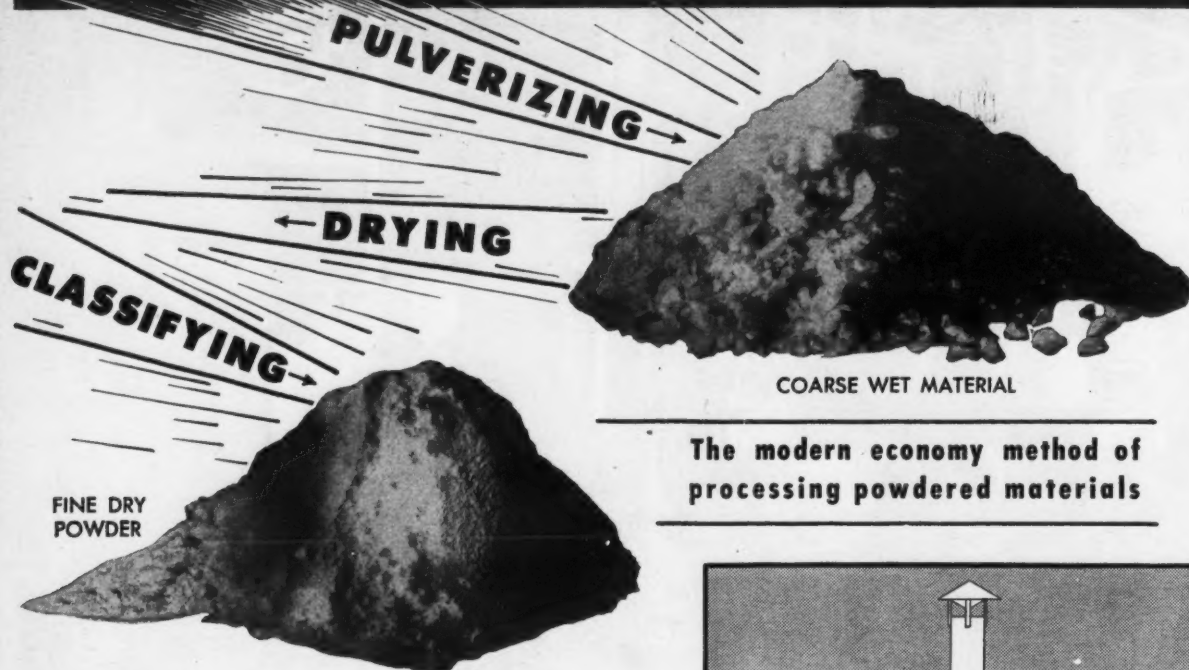
BRANCHES AND DEALERS IN PRINCIPAL CITIES THROUGHOUT THE WORLD



B-374

Check 3835 opposite last page

Raymond Flash Drying IN ACTION



The modern economy method of processing powdered materials

RAYMOND Flash Drying shortens the process time between the raw material and the finished product. Its many advantages are major factors in reducing production costs:—

SIMPLICITY—One complete unit mill system in which the material is handled automatically by clean, dust-free operation.

RAPIDITY—The fine particles are dried instantaneously in a hot airstream. The combination of pulverizing, drying, classifying and conveying in one operation saves process time.

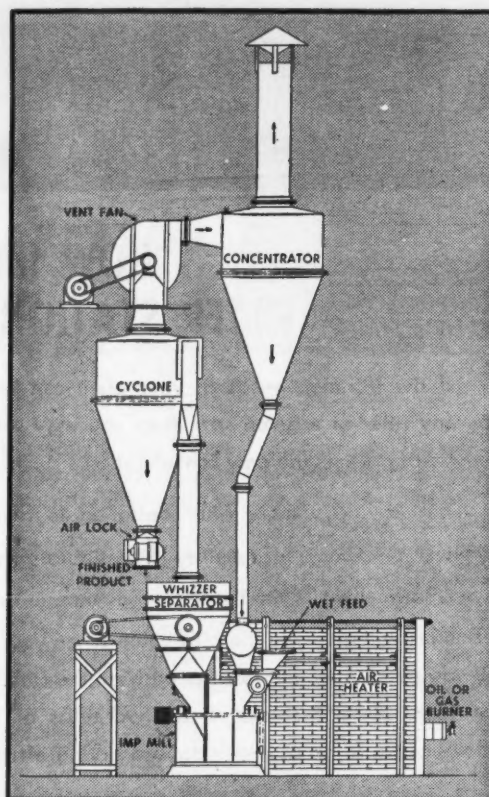
FLEXIBILITY—The units of equipment and connecting piping may be arranged to fit readily into any ground plan or vertical story design with a minimum of space required.

ADAPTABILITY—Many different products can be handled, as Flash Drying may be used with Imp Mills, Roller Mills, Cage Mills or simple Airstream system, as the job requires.

QUALITY—Because of the small amount of material in the system at one time, close control is provided over the finished material in fineness, dryness and final temperature, insuring a uniform, free-flowing, quality product.

Write for details, and tell us your requirements in plant capacity, and specifications of the finished material.

RAYMOND FLASH DRYING SYSTEM with Imp Mill and Whizzer Air Separator



PROCESSING EQUIPMENT

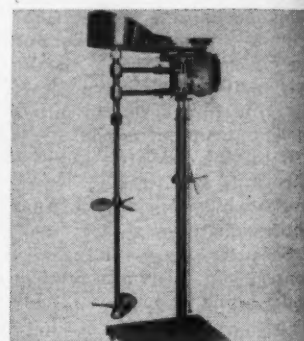
Mobile 3-speed mixer is easily adjustable to various heights

Has belt drive; operates at 175, 325, and 575 rpm

Uses: Mixing slurries and solutions.

Features: Mixer comes equipped with rollers for mobile operation. Both the propeller and stand shafts are adjustable for unlimited settings for "above-and-below" floor level tanks.

Description: Three-speed mobile mixer is fitted with standard belt drive for propeller speeds of 175, 325, and



Mixer is mounted on stand equipped with rollers for mobile operation

575 rpm. All parts coming in contact with materials being processed are made of stainless steel.

Units are available with various size motors and blades. Mixer equipped with $\frac{1}{4}$ hp motor has 6" blades, $\frac{1}{2}$ hp with 8" blades, and the $\frac{3}{4}$ hp with 10" blades. Largest blade size is 18".

(Three-speed mobile mixers are product of Terriss Division, Consolidated Siphon Supply Co., Inc., 22 Wooster Street, New York 13, N.Y.)

Check 3837 opposite last page.

COMBUSTION ENGINEERING, INC.

Raymond Division

1116 W. BLACKHAWK ST.
CHICAGO 22, ILLINOIS

SALES OFFICES IN
PRINCIPAL CITIES

Combustion Engineering-Superheater Ltd., Montreal, Canada

Check 3836 opposite last page

NEXT MONTH

Every chemical engineer is interested in heat exchangers. Pros and cons of falling-film type units in use at Stauffer's hydrocarbon chlorination plant are revealed in March CP.

1. GRIZZLY ROD SCREEN
toughest accuracy
2. TRI-ROD SCREEN
knife-like accuracy
3. GRIZZLY ROD WITH
SAID ROD
toughest accuracy
4. ROUND ROD SCREEN
long life accuracy
5. ISO-ROD SCREEN
prolonged accuracy

BEE-ZEE SCREENS
SHAPED
TO MAKE YOU
MONEY

Right now, countless
Bee-Zee screens are doing
their job—sizing, deliquifying,
drying, filtering—making
money for someone!

Why don't you cash in on
these famous stainless steel
screens? They're precision-welded
for amazingly uniform separating
...never rust or corrode...can be
form-fitted to every type of
equipment. Whatever your
screening operation, there's a
Bee-Zee screen that can make you
extra profit dollars. For specific
information about the screens
you need...wire, write or
phone Dickens 2-5154

Collect. BIXBY-ZIMMER ENGINEERING CO.
729 Abingdon Street, Galesburg, Illinois

Check 3838 opposite last page

PROCESSING EQUIPMENT

Up to 10 tons per hr handled by compact impact mill

Uses: Grinding or blending various free-flowing dry materials in pilot plant or small production quantities.

Features: Compact mill is adaptable to either batch or continuous operation. Throughput capacity is about 10 tons per hr.

Description: Centrifugal impact mill has 27" rotor and can be equipped with either constant- or variable-speed drive motors. Mill can be operated at any pre-determined



Mills have 27" rotor, can be operated at impact velocities up to 25,000 fpm

impact velocity up to 25,000 fpm. If necessary, rotors and impactors can be furnished in wide range of corrosion and abrasion-resistant alloys.

(Centrifugal impact mill is product of Entoleter Division, Safety Industries, Inc., New Haven, Connecticut.)

Check 3839 opposite last page.

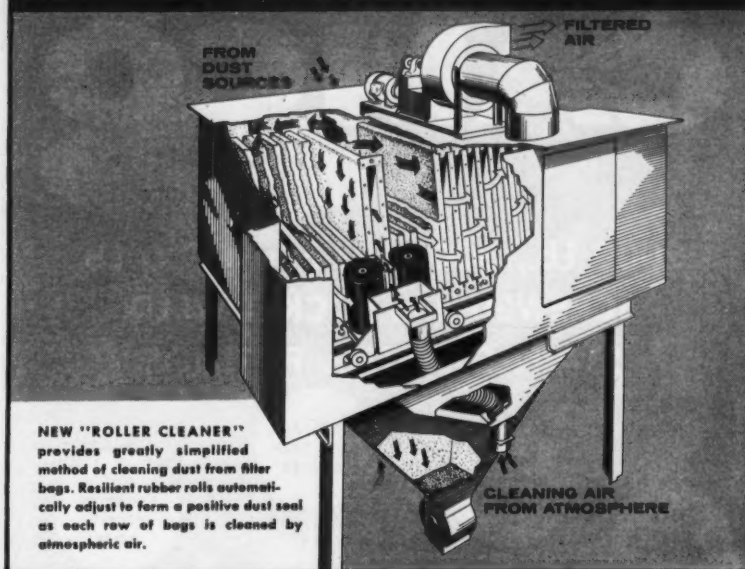
Barrel finishing machine which, according to manufacturer, permits finishing work to be done in a fraction of the time previously necessary, with no damage to parts, is described in illustrated four-page Bul 255 — Metal Finish, Inc., 410 Frelinghuysen Ave., Newark, N. J.

Check 3840 opposite last page.

Electric furnaces for both laboratory and production use are subject of 2-page bulletin. "Electric Furnaces and Ovens" — L & L Manufacturing Co., 136 Eighth Street, Upland, Delaware County, Pennsylvania.

Check 3841 opposite last page.

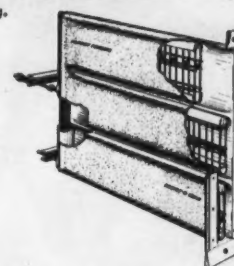
NEW SLY DYNACLONE® DUST FILTER



NEW "ROLLER CLEANER" provides greatly simplified method of cleaning dust from filter bags. Resilient rubber rolls automatically adjust to form a positive dust seal as each row of bags is cleaned by atmospheric air.

Patent Nos. 2583039, 2695681, 2867289. Other Patents Pending.

NOW! As Much As 3 TIMES LONGER FILTER BAG LIFE



NEW SLY "RESIST-O-WEAR" FILTER BAGS (patent pending) provide complete dust filtration with as much as three times longer life than conventional bags. This has been proved on the toughest field installations.

The new bag has three equal-size sections. Each pocket has two spacers, making a total of six per bag. Weight is distributed on

three seams rather than one, minimizing strain. A special protective flap on the back end prevents abrasion from incoming dust.

Now standard in the new "Roll-Clean" Dynaclone, SLY "Resist-O-Wear" bags combine with all the other superior Dynaclone features to assure greatest dust collecting efficiency with unequalled maintenance-free service.

ALL THESE FEATURES IN ONE DUST FILTER

- New "Resist-O-Wear" bags last as much as three times longer.
- Constant suction at dust sources—complete dust collection.
- Automatically self-cleaning for continuous operation.
- Free-rolling cleaner. Complete dust seal—automatic seal adjustment.
- Greater filtering capacity; smaller space requirements.
- Simplified construction for ease of inspection and servicing.

SEND FOR New Bulletin 105 and
New 36-page Dust Control Catalog 104.



THE W. W. SLY MANUFACTURING CO.

4754 TRAIN AVENUE • CLEVELAND 1, OHIO
OFFICES IN PRINCIPAL CITIES

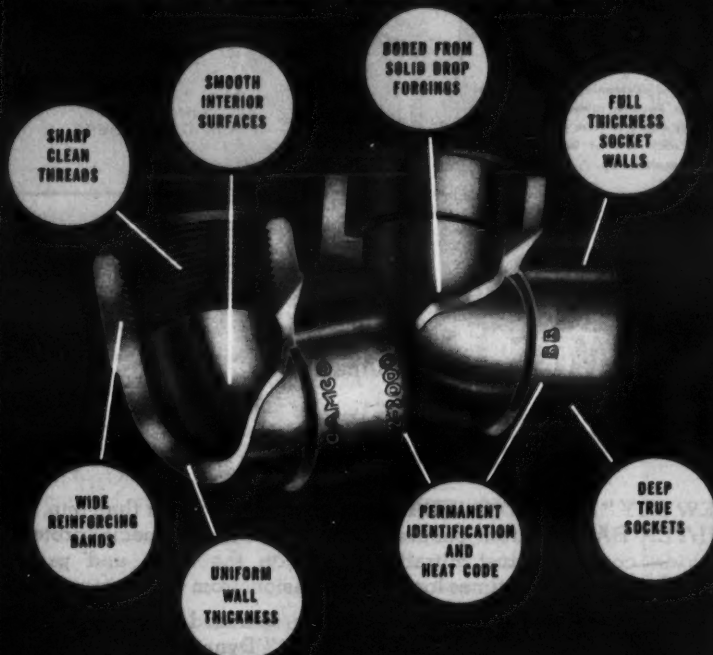
OVERSEAS LICENSEE: ANDREW AIR CONDITIONING LTD., LONDON S. W. 1, ENGLAND

Check 3842 opposite last page

SPECIFY CAMCO

THE *Quality* LINE
IN FITTINGS

2000 Lb., 3000 Lb. and 6000 Lb.
SCREWED and SOCKET WELD
STAINLESS STEEL FITTINGS



Special non-standard fittings furnished to order . . . One source for all your stainless fitting requirements.

THE *Quality* LINE
IN FITTINGS

CAMCO
FITTINGS, INC.

Also available—150 lb. screwed fittings and all schedules of butt weld fittings.

CAMCO FITTINGS, INC., 301 State Street
North Haven, Conn.

- ☐ Catalog Extra Heavy 657.
- ☐ Catalogs covering complete line.
- ☐ Furnish address of area distributor.

NAME _____
COMPANY _____
ADDRESS _____
CITY _____ ST. _____

No. Haven, Conn.

WEST COAST AGENT
AND WAREHOUSE

J. J. GATELEY CO.
8283 Baldwin Street
Oakland 21, California

PROCESSING EQUIPMENT

Bleaching system processes various pulps, efficiently, economically

Uses: Continuous bleaching of pulp produced by either chemical, semi-chemical, or mechanical processes.

Features: System is designed for efficient service under rugged mill conditions. Components used are of both new and proven designs, assuring maximum efficiency with minimum maintenance.

Description: Continuous pulp bleaching systems are designed and engineered for each individual mill. Wide choice of materials of construction provide necessary corrosion resistance where required. Flexibility in design permits ideal location of components at each installation.

Major components are blending chest, chlorination tower, chlorine washer, caustic extraction tower, caustic washer, hypochlorite bleach tower, hypo washer, and bleached stock storage facilities.

Heart of system is vacuum bleach washer, in wide use throughout pulp industry for many years. Stock chest agi-

tators feature adjustable pitch propellers designed for most efficient power use. High-density stock mixers are available with either single or double shafts.

Bleach tower dilution nozzles, mounted in base of high-density down-flow towers, are regulated by single control. High-density storage tower has oscillating design mining nozzles. Spring-loaded check valves automatically prevent pulp backup.

Two-jet oscillating barrel assures complete discharge of stock from tower with minimum mining water. Rotary motion barrel has large bearing surfaces and conventional ring packing.

(Continuous pulp bleaching systems are product of Dorr-Oliver Incorporated, Stamford, Connecticut.)

Check 3844 opposite last page.

Batch processing units, package-type, for experimentation, research, and development are described in four-page folder. — Artisan Metal Products, Inc., 73 Pond St., Waltham, Mass.

Check 3845 opposite last page.



"Gentlemen: This letter is being typed on our new Tiger Rag Bond paper. Notice how it takes all these erasures with hardly a trace."

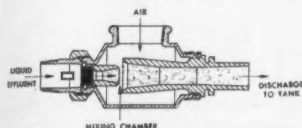
Check 3843 opposite last page

PROCESSING EQUIPMENT

Efficient aeration ejectors give higher O₂ absorption, need little power

Uses: Introducing and dispersing air into biological oxidation waste treatment systems.

Features: Units have low initial cost, are simple to install, and can be used in new or existing installations. Ejectors are reported to cut by 95% the high concentration of bacteria cells and provide 20 to 25% oxygen absorption as compared to 4 to 5% absorp-



Aeration ejectors are precision-made, have low initial cost, and need practically no maintenance

tion obtained by conventional apparatus. Horsepower savings are over 40%.

Description: Aeration ejectors are available in a wide range of sizes. Units are normally made in all-bronze construction with stainless steel pressure nozzle.

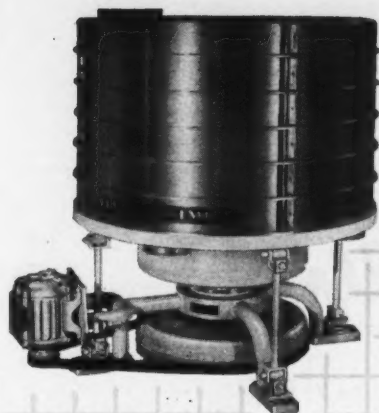
Device consists of a combination of jets forming a venturi section submerged in a tank, ejector must normally be supplied with effluent liquor at pressure of 15 to 20 psi. Air is furnished at pressures slightly in excess of submergence head.

Liquor and air are blended into a homogenous mixture of finely intermingled particles in mixing chamber. Discharged from ejector, mixture sets up strong mixing motion in the tank. Intimate contact between activated sludge floc and the finely divided air particles and organic matter in tank is thereby affected.

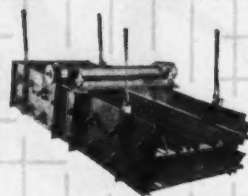
Ejectors operate practically trouble-free, keeping maintenance at a minimum.

(Further information about aeration ejectors may be obtained from Penberthy Manufacturing Company, 1242 Holden Avenue, Detroit 2, Michigan.)

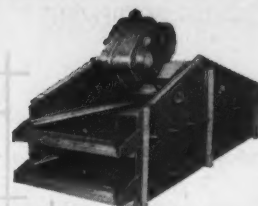
Check 3846 opposite last page.



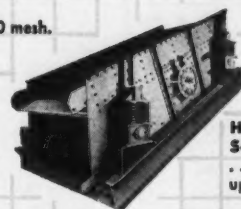
Stainless Steel Gyratory Screen
... for size classifications 2 to 325 mesh.



Small Inclined Screens
... for separations 1½ inches to 40 mesh.



Horizontal Screens
... for separations up to 2½ inches.



Heavy Duty Scalping Screens
... screen apertures up to 12 inches.

SCREENS

world's widest line!

... From smallest to largest

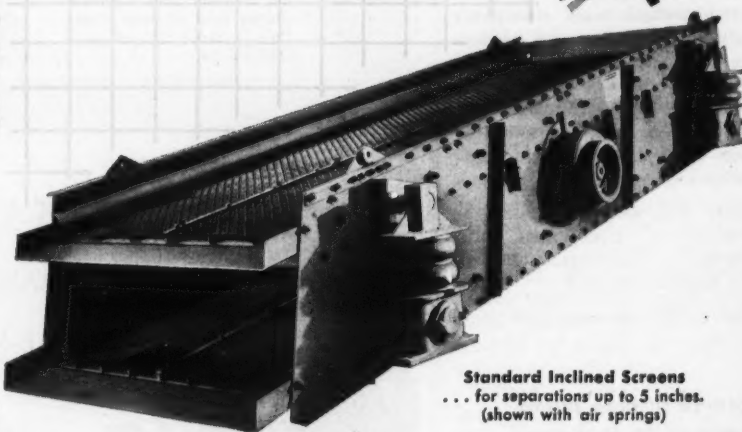
... Separations from 12 inches to 325 mesh.



Allis-Chalmers not only offers you the most complete line of screens, but also provides the skilled helpfulness of experienced application engineers and modern laboratory facilities for running tests, if tests are necessary.

- Suspended or floor mounted, or supported on air springs.
- Inclined or horizontal.
- Specially built screens for any application.
- Wet or dry operation.
- And you can get your screen complete with motor, drive and control — all from one manufacturer!
- Screens for hot materials handling.
- Dust-proof enclosures.
- Heated decks for fine moist materials. Also mechanical anti-blinding device.

For valuable screen selection guide, 26C6177M, write direct to Allis-Chalmers, Industrial Equipment Division, Milwaukee 1, Wisconsin.



Standard Inclined Screens
... for separations up to 5 inches.
(shown with air springs)

ALLIS-CHALMERS

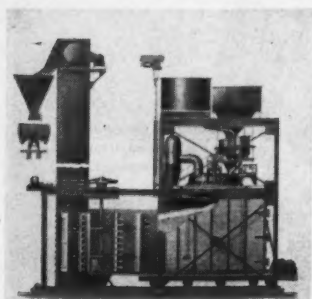


A-5583

Check 3847 opposite last page

Den system allows ease of operation in producing 'Super'

Although many fertilizer plants have switched to a continuous process for manufacture of normal run-of-pile fertilizer, International Minerals & Chemicals plant, Chicago Heights, Illinois is using the den and excavator system because of ease of operation



Den and excavator can be operated with three or four men easily

and accuracy possible. IMC finds that three to four men can operate the unit without difficulty.

Den and excavator accumulates the mixture of phosphate rock and sulphuric acid as a honeycombed mass, dissipates excess moisture, and shaves the block of "super" into little slices for storage.

Cycle of operations is approximately two hours for 40 tons size when used to capacity.

(Den and excavator unit is product of Sturtevant Mill Company, Dorchester, Boston 22, Massachusetts.)

Check 3848 opposite last page.

Canned turbine pump featured on leakproof filtration unit

Rotating magnetic field drives pump impeller

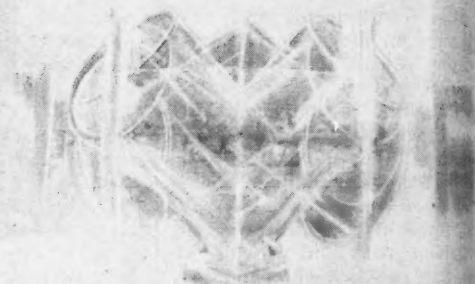
Uses: Filtering costly or critical solutions in chemical, pharmaceutical, food, and allied industries.

Features: Compact filtration unit is leakproof, low cost, and portable. Rotating magnetic

ENTIRELY NEW PRINCIPLE enables you to...

Blend

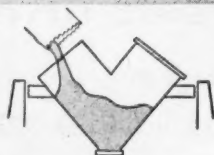
liquids and solids
intimately in one operation



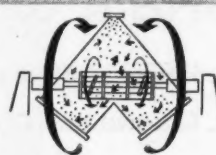
It is now practical, with the P-K "Twin-Shell"™ blender, to blend many difficult formulations that have heretofore been either impossible or impractical because of the number of separate operations required to achieve a desired product. With the new "Twin-Shell" blender,

liquids, solids, clumpy and crystalline materials can all be intimately blended in one operation. Average blending time: 5 to 15 minutes. The P-K "Twin-Shell" blender is unlike any other blender. It works on an entirely new blending principle. Here, in diagram, is how it works.

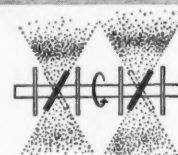
Patented



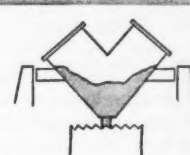
CHARGE DRY SOLIDS through top of either shell. Optimum charge level for most materials is about 65% of total shell volume.



TUMBLE AND AERATE. As shell revolves, rapidly spinning wire cage intensifier breaks up agglomerates, literally creates dust storm in material.



ADD LIQUID. Centrifugal force sprays atomized liquids from periphery of control discs on Liquid-Feed Bar into finely dispersed solids.



DISCHARGE PRODUCT easily through apex of shells. Accessibility of interior and easy removal of Liquid-Feed Bar speed cleaning.

Get new ideas for your
blending process at P-K's
pre-test lab



Complete, scientific investigation of all types of blenders now available at Patterson-Kelley.

Blending of complex formulations is full of variables. The equipment and procedure that are ideal for one combination of ingredients may be unsatisfactory for another. Proper selection of equipment demands thorough scientific investigation. You can conduct your investigation at Patterson-Kelley's Customer Pre-Test Lab, at East Stroudsburg, Pennsylvania. Since P-K makes practically all types of blenders, you can run conclusive comparison tests with your materials. Trained technicians will help you.

To set up an appointment, just place a collect call to Russell Dotter at Patterson-Kelley. Tel. No.: Stroudsburg 820. He'll be happy to tell you how much of your materials to bring and to give you other details. East Stroudsburg, in the Pocono Mountains, is just 2 hours from New York City, easily accessible by all carriers.

PROBLEM: to blend:—precisely—varying amounts of lumpy solids, powders, crystalline materials and small amounts of liquid.

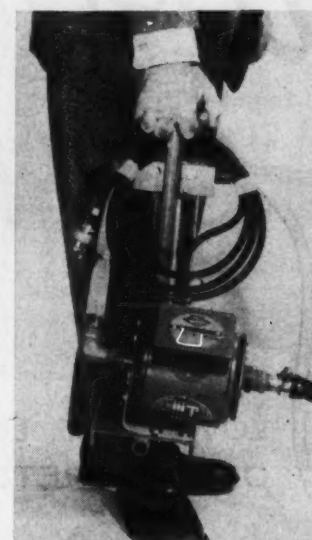
SOLUTION: Charge materials to P-K "Twin-Shell" Liquid-Solids Blender. Press start button.



PROCESSING EQUIPMENT

field drives pump, eliminating need for any seals or stuffing boxes. Filter cartridge removes particles ranging in size from 150 down to 1 micron.

Description: Filter uses canned turbine pump and motor unit which is continuously lubricated by solution being



Compact filtration unit is leak-proof, has no seals or stuffing boxes

pumped. Conventional lubricants are not required. Pump's flow rate is easily adjusted by simple pinch valves.

Stainless steel filter tube contains element of specially processed cotton or dynel yarn wound around stainless steel supporting core. Numerous interlaced layers result in about 500 sq in of filtering area per cartridge. In precious metals plating solution filtration, precious metals are fully reclaimed by simply igniting the inexpensive cartridge.

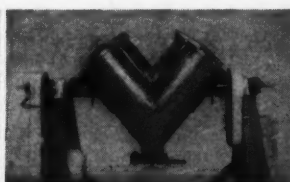
Filtration area may be boosted by attachment of additional filter tubes. Single cartridge can handle up to 300 gph. Four-tube filter can process up to 800 gph. On multiple-tube units, individual cartridges may be replaced without stopping filtering operations and holding up production.

(Pre-Met solution filters are product of Sel-Rex Corporation, Nutley, New Jersey.)

Check 3850 opposite last page.



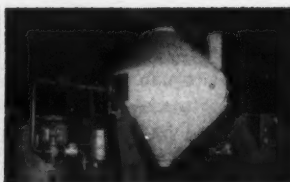
"TWIN-SHELL" Liquid-Solids laboratory models are made in transparent Lucite or stainless steel, in 8 and 16 quart sizes.



PRODUCTION MODELS of the "Twin-Shell" blender range up to 50 cu. ft. capacity. (Intensifier and Liquid-Feed Bar optional.)

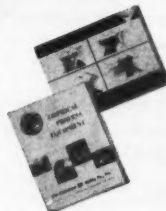


VACUUM TUMBLE DRYERS by Patterson-Kelley are available in sizes down to the standard 1 cu. ft. capacity lab model.



PRODUCTION MODELS of the Vacuum Tumble Drier have capacities up to 150 cu. ft., come factory aligned, piped, instrumented.

BLENDER LITERATURE. Specialized information and data in greater detail are given in two Patterson-Kelley publications: Bulletin No. 16, Chemical Process Equipment and Bulletin No. 15A-1, Twin-Shell Laboratory Blenders. Write for your copies today. Patterson-Kelley Company, Chemical and Process Equipment Division, 1802 Hanson St., East Stroudsburg, Pa. 15



Patterson Kelley
Chemical and Process Equipment Division

Check 3849 opposite last page



At Last!

LOW-COST, LONG-LASTING REPAIR
OF CONCRETE SURFACES WITH

new Penntrowel

Resigning yourself to a costly replacement job on worn-out or corroded concrete or cement surfaces in your plant? Don't call a contractor—*repair* those damaged areas with new Penntrowel surfacing compounds!

PENNTROWEL is a new kind of resin surfacing material. It's tough, impermeable . . . resists acids, alkalis, solvents . . . bonds inseparably to repaired surfaces to give you long, trouble-free service.

PENNTROWEL is easy and economical to use. No expensive equipment needed—you just trowel it on. No shut-downs—Penntrowel cures overnight for next-day service. And its cost is amazingly low.

PENNTROWEL has been proved on the job in Pennsalt's own plants. Its three specialized grades give top performance in all kinds of corrosion or wear applications.



WRITE TODAY

for Penntrowel Bulletin CP-627
and installation cost data.

**Pennsalt
Chemicals**

ESTABLISHED 1850

Corrosion Engineering Products Dept. 695
PENNSALT CHEMICALS CORPORATION
Natrona, Pa.

Penntrowel is a trade-mark of Pennsalt Chemicals Corp.



**PLANT ENGINEERING
MAINTENANCE & SAFETY**

. . . electrical & mechanical developments

How compressors are used in CP industries

Putman survey finds reciprocating type
accounts for two-thirds of total

The chemical processing industries use nearly twice as many reciprocating compressors as centrifugals and rotaries combined, according to a recent survey made by the Research Department of Putman Publishing Company, publishers of **CHEMICAL PROCESSING** magazine.

Basic inorganic and organic chemicals, petrochemicals, petroleum refineries, paper and board, and rubber processing were included among 147 plants polled.

These plants reported a total of 2140 compressors (16 hp and over) in use. Of these, 68% were reciprocating, 17% centrifugal, and 15% rotary.

About a third of the reporting plants installed in 1958, or expect to install in 1959, one or more new compressor units.

From findings of the study, the Putman Research Department estimates that, on the average, new compressors purchased each year by chemical processing plants already in operation amount to about 3.5% of compressors in use. (This figure does not include the hundreds of units purchased each year for newly built plants.)

Largest number of com-

pressors reported used by a single plant was 84. Eight plants reported more than 50 compressors in use in each; 14 reported between 26 and 50 each; 41 between 11 and 25 each; 35 between six and 10 each, and 49 plants between one and five each.

Other findings disclosed in the survey were:

Fifty-three percent of all compressors are used in process service (process gas, process air, vacuum), with the remaining 47% used for plant air, instrument air, refrigeration, conveying, etc.

In process service, hydrocarbons, synthesis gas, propane, ammonia, chlorine, hydrogen, and nitrogen were the gases most frequently reported being compressed.

About a third of all compressors are over 250 hp, and a little under a third are over 125 psig. (These ratios are somewhat higher for reciprocating compressors alone.)

Sixteen percent of all compressors (but 45% of centrifugals alone) operate in three or more stages.

Seventy percent of all compressors (but 93% of rotaries alone) are electric-motor-driven.

Relative Use of Compressors

Product	No. of plants in survey	Avg. No. of compressors per plant
Heavy inorganic chemicals	30	13
Ammonia synthesis	10	23
Synthetic rubber	8	23
Synthetic plastics and resins	11	8
Other organic & inorganic chemicals	52	16
Petroleum refining	13	16
Paper and paperboard	18	9
Rubber	5	7
Total	147	15

Check 3851 opposite last page

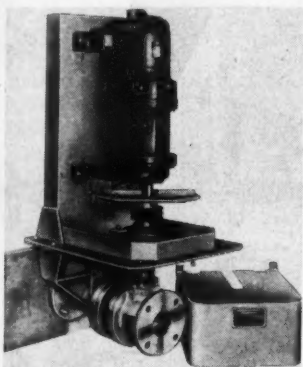
**When power fails,
valve closes
automatically**

Valve is open, closed by built-in motor

Uses: For heavy duty liquids service.

Features: Unit closes automatically when power fails. Opening and closing is accomplished by built-in electric motor. Fail-safe mechanism is incorporated that immediately closes valve when power failure occurs.

Description: Heavy-duty liquid valve is designed for remote control operation. Torque-type motor is arranged to operate to a stall in both open and closed positions so



Heavy-duty liquid valve, shown with cover removed, is opened and closed by built-in electric motor

that no limit switches are required. Floating bronze valve ball is hard chrome plated to resist scratching, pitting, and abrasion. Resilient, synthetic rubber seat is wiped clean each time valve is opened or closed.

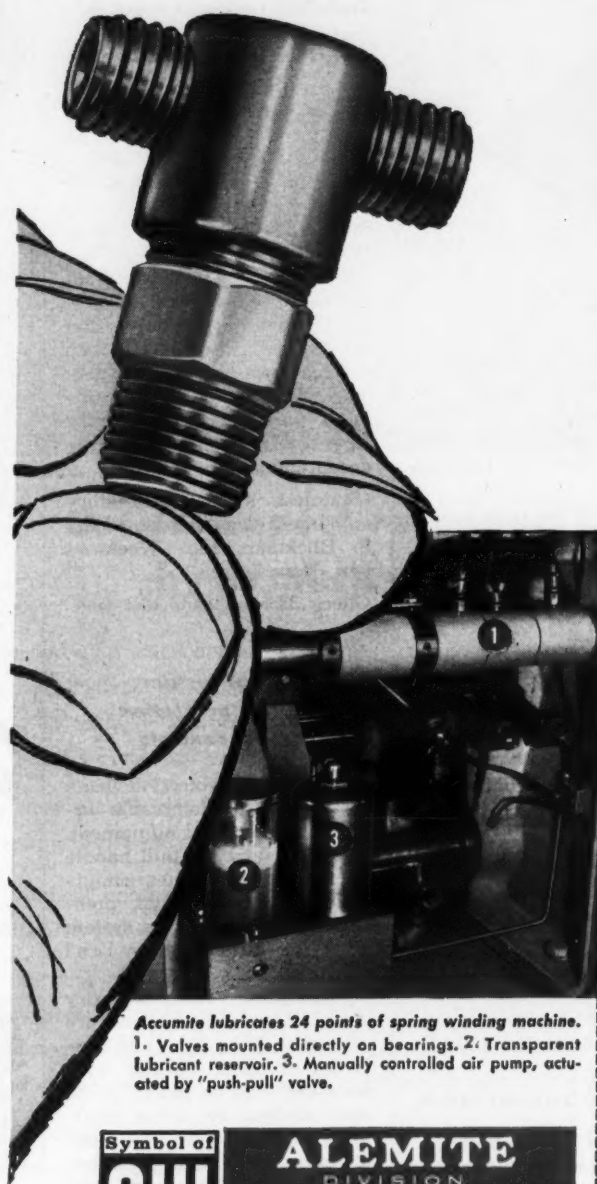
Full round port area does not change water stream shape as it passes through valve. Valve is manufactured in two standard sizes, for 3" and 4" pipe. Models are available in stainless steel for highly corrosive applications.

(Models MV-1000 and MV-2000 are product of Gemco Inc., P.O. Drawer 3908, Shaker Square Station, Cleveland 20, Ohio.)

Check 3852 opposite last page.

ACCUMITE[®] BY ALEMITE

...TO GIVE ANY MACHINE ALL THE ADVANTAGES OF CENTRALIZED LUBRICATION...AT LOW COST!



Accumite lubricates 24 points of spring winding machine. 1. Valves mounted directly on bearings. 2. Transparent lubricant reservoir. 3. Manually controlled air pump, actuated by "push-pull" valve.



1850 Diversey Parkway, Chicago 14, Ill.

**Engineered for limited space,
outperforms many higher-priced systems!**

Alemite—with more than 40 years of centralized lubrication experience—announces an all-new compact system complete with pump, metering valves and controls—especially designed to service many machines and vehicles where centralized lubrication has been impractical until now!

Alemite's new compact Accumite system is especially adaptable to light, precision, multiple-bearing machines that have limited installation space. Its small size and simple installation overcomes cost limitations in most plants. Typical applications are: packaging, canning, labeling and textile machines...and machine tools. It is also suitable for tractor trailers, lift trucks and farm implements.

ACCURATELY METERS THESE SHOTS OF OIL OR GREASE

♢ .003 cu. in. ♢ .006 cu. in. ♢ .009 cu. in.

**ALL THE ADVANTAGES OF "BUILT-IN"
MEASURED LUBRICATION—PLUS COMPACT SIZE!**

- Meters exact amounts of refinery-clean lubricants to all bearings whenever system is operated.
- Eliminates shutdown time for lubrication.
- Seals lubricant against dirt, grit and water.
- Prevents bearing troubles due to neglect or use of wrong lubricants.
- Services all bearings in one operation.
- Avoids work spoilage and bearing repairs due to over-lubrication.

**Mail coupon for
full information!**

ALEMITE, Dept. K-29
1850 Diversey Parkway, Chicago 14, Ill.

Please send me all the facts about your new "Miniature" Accumite system.

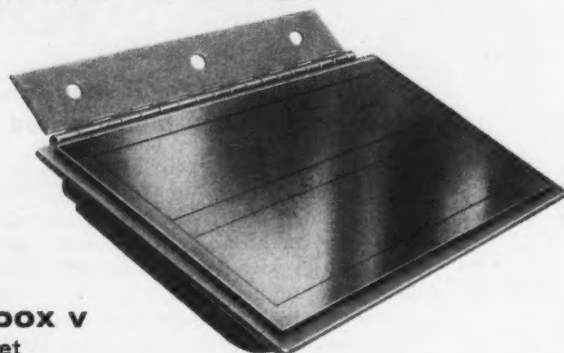
Name _____
Company _____
Address _____
City _____ Zone _____ State _____



NEW FOR PROCESS INDUSTRIES...

lowest* cost magnetic protection
against tramp iron with

STEARNS INDOX SEPARATORS!



Stearns INDOX V Plate Magnet

provides separating efficiency far superior to ordinary plate magnets. For processes that involve handling flowing material in chutes, spouts, ducts or on conveyors, check the Stearns Indox V Plate Magnet before you specify. Greater tramp iron

protection at lower cost, less weight. Holding power up to 25 percent greater than ordinary magnets. Extremely compact, saves space. Standard widths from 4 inches to 48 inches to fit most chutes. Write for Bulletin No. 1073-B.



Stearns INDOX Grate Magnet

can be installed in any hopper or floor opening, chute or duct. You get continuous, low-cost protection against troublesome tramp iron —

with 4 times more protective surface than in ordinary grate magnets. Collecting tubes with continuous magnetic poles leave no "dead" spots where tramp iron can sneak past. Wing-type unit for floor opening or hopper installation, drawer-type unit for chutes and ducts. Both types with either single or double banks of collecting tubes, sizes to fit most standard systems, plus special designs for circular or irregular openings. Write for Bulletin No. 1072-B.

*Let us give you a dollar-for-dollar comparison.

ONLY STEARNS offers the revolutionary advantages of INDOX — an amazing ceramic magnet material that is permanently magnetized to produce an ideal flux pattern for maximum effective tramp iron separation.

STEARNS MAGNETIC PRODUCTS

A DIVISION OF THE INDIANA STEEL PRODUCTS COMPANY

635 SOUTH 28TH STREET

MILWAUKEE 46, WISCONSIN

Check 3854 opposite last page

ENGINEERING & SAFETY



Stainless radiochemical tracer laboratory ...

... formed central part of AEC's three-phase exhibit during the Second United Nations International Conference on Peaceful Uses of Atomic Energy at Geneva, Switzerland in September 1958. AEC personnel used the fully equipped laboratory to demonstrate radioactive labeling of organic compounds and to show results obtained through research with these materials. Laboratory equipment was fabricated largely from stainless steel for easy decontamination.

(Stainless steel laboratory equipment was fabricated by S. Blickman, Inc., Weehawken, New Jersey.)

Check 3855 opposite last page.

Dry chemical systems provide fire protection with remote controls

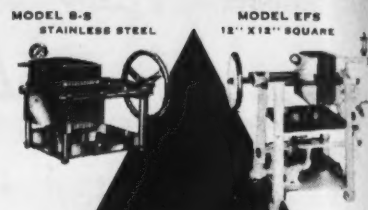
Uses: For protection from fires caused by flammable liquids and electrical equipment.

Features: Single pull handle at remote hose sites simultaneously opens valve, pressurizes tank, and fills system with fire-killing chemical powder.

Description: Stationary dry chemical hose line systems are offered in 150-, 300-, and 500-lb dry chemical capacity. Systems come in compact "package" designs requiring minimum of floor space. All models carry Underwriters' Laboratories and Factory Mutual approval.

(Stationary dry chemical systems are product of the C-O-TWO systems division, The Fyr-Fyter Co., 221 Crane St., Dayton 3, Ohio.)

Check 3856 opposite last page.



Ertel

MULTI-PURPOSE FILTERS

WRITE FOR
CATALOG 58

JACKETED
MODEL 10

MODEL EFS-B
PILOT OPERATIONS

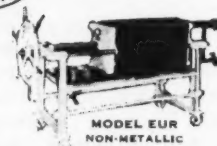
MODEL EW
POLISHING TYPE

MODEL
ECS
CYLINDER
DISK

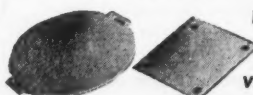
MODEL EBW
PORTABLE



MODEL EUS
CAPACITY TO 80 GPM



MODEL EUR
NON-METALLIC



ASBESTOS
FILTER
SHEETS
Various Sizes

Ertel Asbestos Filter Sheets for ultra polished brilliance are used for many fine perfumes and cosmetics. Available in 10 grades to fit all standard filters. Write regarding samples for superior result tests in your filter.

ERTEL

ERTEL ENGINEERING CORPORATION
Liquid Handling Equipment Manufacturers Since 1932
KINGSTON 1, NEW YORK

Check 3857 opposite last page

CHEMICAL PROCESSING

THAT'S INTERESTING

Booze bottle bogey

If you want to separate guest from pest and really finger the elbow-bending freeloader, dispense your choice booze from lethal looking lab decanters. The sot, bending to the task of liberal libation, will get a jolt before instead of after when he focuses on the bottles labeled concentrated nitric, sulfuric, or hydrochloric acid. What alcho, no matter how determined, could ignore the prospect of incurable acid stomach—ach these authentic 8 ounce reagent bottles bode? (Purveyed by Bottle-Nose Jones)

Luminous paint call

The Armed Forces need a self-luminous paint that can easily be seen in the dark for at least five years. It should require no external excitation and emit no harmful radiation.

For more information on product at right, specify 3858 see information request blank opposite last page.



FALK Steelflex SPACER COUPLINGS

save time and money in industrial operations

FALK and STEELFLEX are Registered Trademarks

Cut disconnect-reconnect time by as much as 50%

The FALK Spacer Coupling is specially designed for quick installation or removal *without disturbing the driving or driven unit*. This feature can save you up to 50% in disconnect-reconnect time when critical equipment—a process pump, for example—needs repair or replacement.

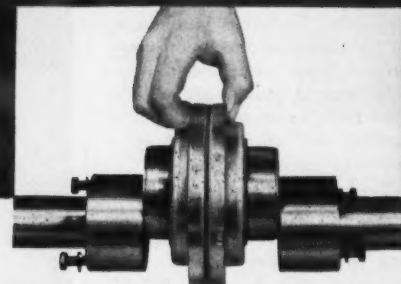
Here's another saving: with the FALK Spacer Coupling, you can quickly realign shafts *without the usual loss of operating temperature!*

And still another: you can remove or reinstall the FALK Spacer as a unit *without draining the lubricant*.

Because of its exclusive grid-groove Steelflex design, the FALK Spacer can accommodate residual misalignment—parallel, angular, or (most important) *both*. Also, it provides torsional resiliency that cushions shock and vibration. Thus it saves wear-and-tear on your connected equipment.

To prove these claims and enjoy these savings, install a FALK Spacer on one application—and see for yourself. Consult your FALK Representative or Authorized Distributor.

THE FALK CORPORATION, MILWAUKEE 1, WISCONSIN
MANUFACTURERS OF QUALITY GEAR DRIVES AND FLEXIBLE SHAFT COUPLINGS
Representatives and Distributors in many principal cities.

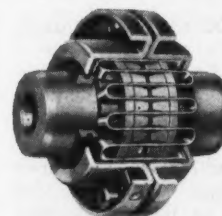


EASY AND QUICK TO INSTALL, DISCONNECT OR RECONNECT

First, mount shaft hubs to allow proper distance between hubs; then, align driving and driven units.

Second, compress Spacer to fit space between hubs and tighten cap screws to pull spacer hubs into the registered fit.

To disconnect, reverse the second step. No draining of lubricant necessary.



The heart of the FALK Spacer
...the basic Type F Steelflex
Write for Service Manual 4838

FALK

...a good name in industry

Provides compressed air dried, cooled, cleaned for controls, processes

Uses: With compressed air instruments or controls and for industrial or chemical processes where the presence of moisture from the atmosphere or dirt or lubricating oil is undesirable or damaging.

Features: Unit provides compressed air dried, cooled, and cleaned.

Description: Method uses two air machines in series, an after cooler and compressed air chiller. In the first stage, hot compressed air temperature is reduced to approximately that of the atmosphere by evaporative cooling. An oil separator removes moisture, oil, or dirt that has been condensed from compressed air.

In second stage, air chiller uses refrigeration to cool and further dry air to meet very exacting specifications.

Typical installation produces 45°F air at 90 psi pressure needing only 5 tons refrigeration for 900 cfm free air. Air moisture will be only .065 lb per 1000 cu ft.

(Aero after cooler and compressed air chiller are manufactured by Niagara Blower Co., 405 Lexington Ave., New York, N.Y.)

Check 3859 opposite last page.

Space-age insulation combines light weight with heat resistance

For 1300 to 2100°F range

Uses: Material is suitable for insulating applications where space and weight are critical.

Features: Material combines light weight with excellent resistance to heat. According to manufacturer, in the 1300 to 2100°F range, it is about twice as effective on a volume basis as any known insulating material.

Description: Called fibrous potassium titanate, product is composed of compact mass of crystalline fibers which due to their fineness, give it a talc-like feel. Because of small

Now... Wheelco sets the pace again...

Ionization Detection System

providing sensitivity never before possible in gas chromatography

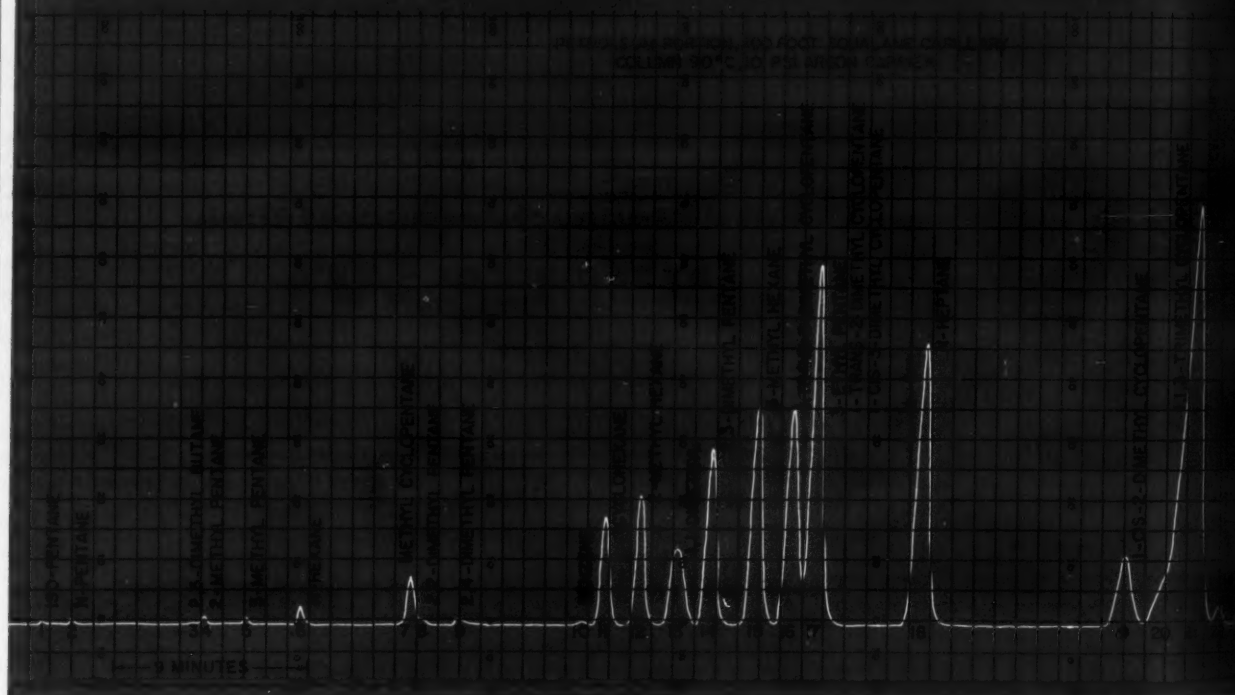
choose from two complete gas chromatography control centers offering these outstanding features

SENSITIVITY Barber-Colman Ionization Detection System provides 100,000 times recorder deflection for as little as 1 part component in 100 parts of carrier gas.

PRECISE COLUMN TEMPERATURE CONTROL requires no relays.

DUAL SENSITIVITY CONTROLS provided by 7 range of sensitivity controls. Range 100,000 to 10,000,000 available 0-2000 volt power supply.

FREEDOM FROM BASELINE DRIFT unique design freedom from baseline drift.



A choice of two new Ionization Detection Systems developed by Barber-Colman offers sensitivities thousands of times greater than any previously available for gas-liquid chromatography. The Barber-Colman Model 10 is designed for permanent laboratory installation and can accommodate either single or dual operation in the same chassis. The Model 20 is a smaller, portable unit developed for industrial applications. Both are completely packaged units, ready for immediate operation.

Ionization Detection Systems normally use argon gas as an ionizing carrier. The carrier gas ionizes vapors of organic sample specimens by transferring energy from its metastable atoms to the specimen atoms. The ionized specimen atoms provide a relatively large electric current and thereby a

sensitivity far greater than with conventional thermal conductivity methods.

Glass, metal, or coiled capillary columns may be used in the Model 10. The Model 20 is designed primarily for capillary columns up to 250 feet long, but coiled 1/4-inch metal columns may be used. Efficiencies of over 1000 theoretical plates per foot have been reported for a 200-foot capillary column when used with an ionization-type detector.

Equally important on most installations is the fact that these new Ionization Detection Systems are backed by Wheelco's factory-trained, nationwide sales and service organization—insuring continued top performance of every unit.

THE MARK OF QUALITY



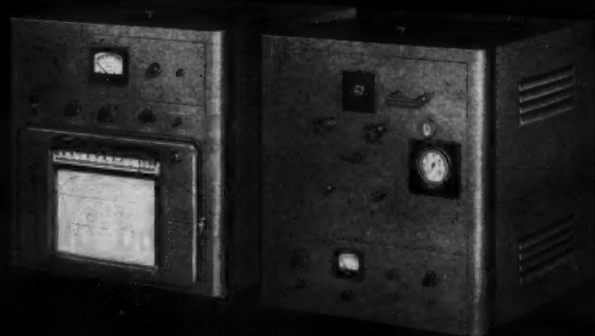
**Wheelco
Instruments**

MODEL 10

Single or dual operation with glass, metal, or capillary columns... flash heaters to bring column up to temperature... individual temperature control for cell and column... optional electronic integrator and automatic readout... cooling... collection valve.

MODEL 20

Portable... single operation with capillary column... flash heater... precise temperature control... compact unit requiring minimum floor table space.



ENGINEERING & SAFETY

diameter (less than 1/25,000 of an inch) and high reflectance of fibers, insulating material blocks heat penetration by scattering incoming infrared rays.

Blocks, which can be formed into any desired shape while wet, show exceptional dimensional stability upon prolonged



In 1300° to 2100°F range, fibrous potassium titanate is said to be twice as effective on volume basis as any known insulating material

exposure to heating. After six days aging at 1900°F, blocks have shown no dimensional change.

Product is easy to fabricate. Available forms include loose fibers, loose fill, blocks of varying densities, mats of various thicknesses, and "lumps". A trowelable material is also available.

(Fibrous potassium titanate is a development of Pigments Department, E. I. du Pont de Nemours & Co., Inc., Wilmington 98, Delaware.)

Check 3861 opposite last page.

Air conditioning operating from a central station is described in catalog which lists 29 different types and sizes. Cat 7558 — Young Radiator Company, Racine, Wis. Check 3862 opposite last page.

Heating problem solutions, and clarification of ordering information are contained in 52-page catalog which also includes new product information. Heating processes also are described. Cat GEC-10051 — General Electric Company, Schenectady 5, N. Y. Check 3863 opposite last page.

Wheelco Instruments Division

BARBER-COLMAN COMPANY

Dept. N, 1520 Rock Street, Rockford, Illinois, U.S.A.
BARBER-COLMAN of CANADA, Ltd., Dept. L, Toronto, Canada

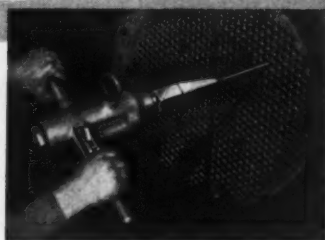
Industrial Instruments • Aircraft Controls • Electrical Components • Small Motors • Automatic Controls • Air Distribution Products • Overdoors and Operators • Molded Products • Metal Cutting Tools • Machine Tools • Textile Machinery

Check 3860 opposite last page

Keep Heat Exchangers on the Line with

WILSON Maintenance Tools

Heavy-Duty TP-301 Cleaner



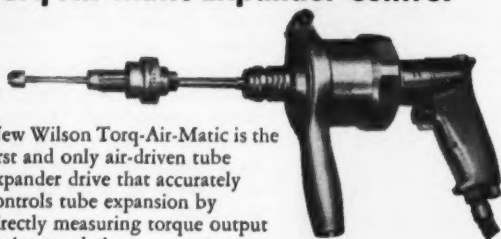
Positive air-driven, hollow rotary shaft, drill type tool. Tube is scavenged with air or water while cleaning.

Tube Expanders



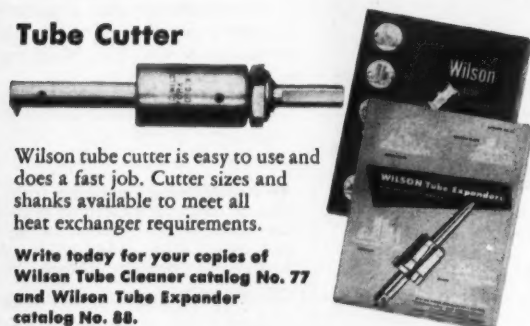
Wilson Models 41 and 44 Tube Expanders incorporate an improved, adjustable ball bearing thrust collar and are designed for efficient, easy rolling and maximum roll length adjustment for various tube sheet thicknesses.

Torq-Air-Matic Expander Control



New Wilson Torq-Air-Matic is the first and only air-driven tube expander drive that accurately controls tube expansion by directly measuring torque output at the mandrel.

Tube Cutter



Wilson tube cutter is easy to use and does a fast job. Cutter sizes and shanks available to meet all heat exchanger requirements.

Write today for your copies of Wilson Tube Cleaner catalog No. 77 and Wilson Tube Expander catalog No. 88.

Representatives in principal cities
Thomas C. Wilson, Inc. • 21-11 44th Ave., Long Island City 1, N. Y.
Cable address: "Tubeclean", New York

WILSON

TUBE CLEANERS • TUBE EXPANDERS

Check 3864 opposite last page

PLANT ENGINEERING MAINTENANCE & SAFETY



Drum of aluminum chloride ready to lower into position over hopper for dumping

Emptying drums of aluminum chloride was hard, disagreeable job requiring work of two men. But switch to explosion-proof lift truck . . .

Slashed by 50% time required to safely charge catalyst hoppers

Problem: Two operators were required to safely elevate, invert, and discharge drums of granular aluminum chloride catalyst in production of ethylbenzene at Koppers Company's plant in Port Arthur, Texas. It was a hard, disagreeable job to operate hand-powered truck because of roughness of acid-proof brick floor, weight of full drums, and other equipment on vehicle.

Sealed hoppers containing aluminum chloride are located in Class 1, Group D area. Working area is extremely limited so truck had to be unusually maneuverable. In addition, area and truck were subjected to hydrochloric acid vapors and aluminum chloride dust during dumping.

Solution: Hand-powered truck was replaced by specially adapted explosion-proof, highly maneuverable lift truck with dual drive wheels. Vehicle exceeds standards for safety in areas otherwise considered unsafe for mechanical materials handling.

Truck is electrically powered, with electrical system totally, physically and mechanically enclosed. Equipment is designed so that temperature of metal surface will not reach ignition point of the explosive atmosphere.

A feature is disc-type brake which is released hydraulically by a dead-man's foot pedal installed on operator's platform. Hydraulic-mechanical linkage

placed inside main housing cuts out electrical control circuit when pedal is released.

Single dead-man directional lever controls forward and reverse and two speeds in either direction. Lifting and lowering are actuated through a dead-man control mechanically linked to electrical controls inside main housing.

Aluminum chloride is fed into process continuously from hoppers, which are refilled directly from drums through an opening in top. Drums have removable tops and ring-type closures. In filling a hopper, drum lid is replaced with a transition piece which attaches to drum with drum lid closure. Opposite end of transition piece is so sized that it mates with hopper manhead, and a slide gate holds contents while drum is inverted.

With transition piece attached to drum, lift truck elevates, inverts, and positions drum over hopper doors. Slide gate is opened, and contents are dumped into hopper.

An asphaltic-like coating (Koppers' Bitumastic) has been applied to truck to protect it from corrosive vapors.

Results: Time required to charge hoppers has been reduced 50 percent since only one man is needed to do work in safe manner with minimum of effort.

(Series 54.00 Go-Getter trucks are manufactured by Revolver Co., 8727 Tonnele Ave., North Bergen, N.J.)

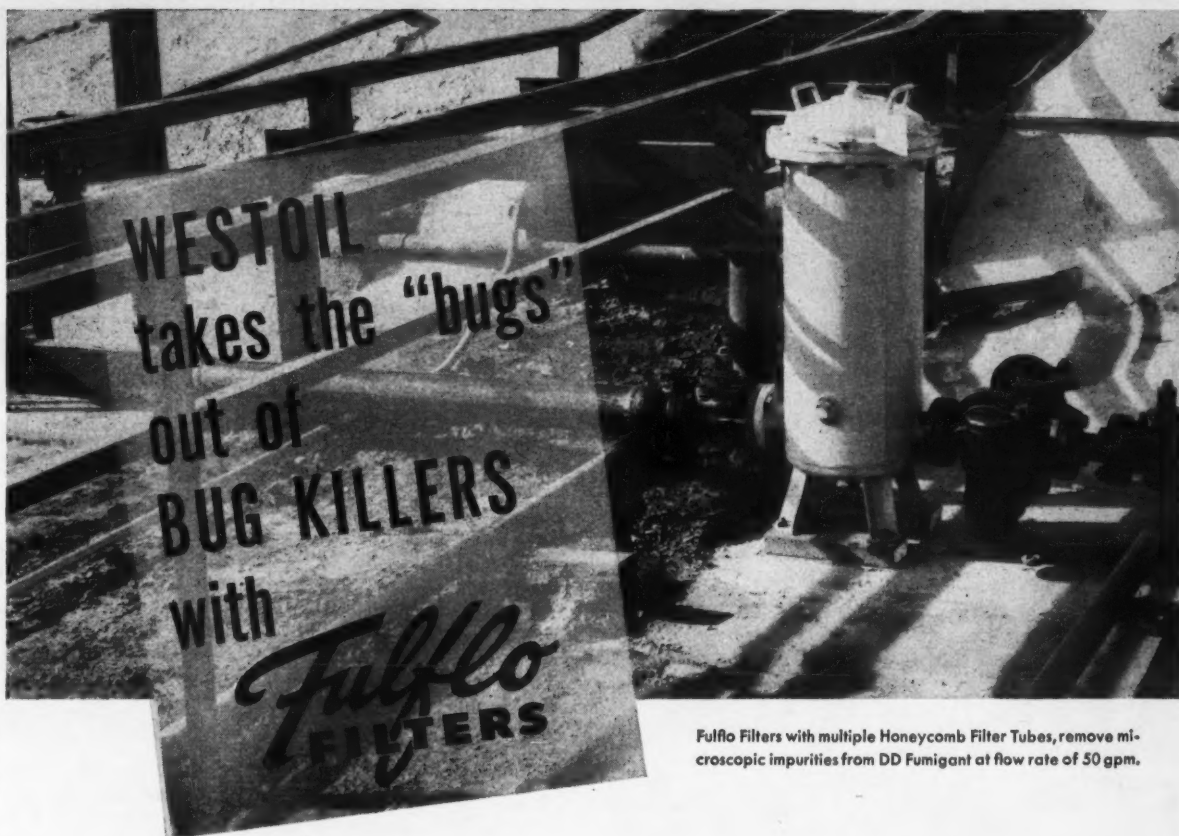
Check 3865 opposite last page.

Interrupter switches, unfused and fused, are detailed in 24-page bulletin. Design details, operation, ratings, and applications are included. Bul 1610A — R & I E Equipment Division, I-T-E Circuit Breaker Co., Greensburg, Pa.

Check 3866 opposite last page.

Materials handling safety tips are contained in 16-page pamphlet which tells reader how to pile and lift and gives rules for driving power trucks. Descriptive literature on "Easy Does It" may be obtained from National Safety Council, 425 N. Michigan Ave., Chicago 11, Ill.

Check 3867 opposite last page.



Fulflo Filters with multiple Honeycomb Filter Tubes, remove microscopic impurities from DD Fumigant at flow rate of 50 gpm.

Westoil Terminals Company ships deadly DD Fumigant to fight vicious tropical insects at South Pacific military installations. As the potent insecticide flows into drums, Fulflo Filters remove microscopic rust, dirt, and other impurities. This eliminates any danger of clogging or scoring the fine nozzles used in injecting the fumigant into the ground.

Fulflo Filters with genuine Honeycomb Filter Tubes, improve product quality, reduce downtime, prolong equip-

ment life and increase production in a variety of operations. You get any desired degree of micro-clarity for all types of industrial fluids: liquid chemicals; pharmaceuticals; water; oils; liquid fuels; compressed air, CO₂ and other gases. They give true *depth* (not just surface) filtration, at minimum pressure drop, for high or low flow rate, pressure, pH, temperature and viscosity. Complete engineering facilities are at your service.



Write for catalog to Department CP

COMMERCIAL FILTERS CORPORATION
MELROSE 76, MASSACHUSETTS
PLANTS IN MELROSE, MASSACHUSETTS AND LEBANON, INDIANA
MICRO-CLARITY AT MINIMUM COST



with genuine Honeycomb Filter Tubes for controlled micro-clarity of industrial fluids.



Selective filtration of oils • water-oil separators • magnetic separators • pre-coat filters • coolant clarifiers • automatic tubular conveyors.

Check 3868 opposite last page

Cut and Thread Pipe by Hand?

...not me or my men when I
can get the new tough fast little

RIGID 300 Power Drive

For Only \$199⁵⁰

*Subject to change without notice.



Weights only 79½ lbs.—all metal

Full Speed...even on 2" pipe or conduit

This new 300 is clear out of its price class! Its **RIGID**-built motor has extra power and extra-long brush life . . . heavy-duty bump-proof switch . . . **RIGID** Speed Chuck with guaranteed tight grip, forward, reverse, replaceable jaw inserts and all-metal hand wheel

...2 extra-strong tool support bars . . . and a lot of other features that make it far the most for your money. You can't afford to be without it—see and try the new 300 at your Supply House!



THREADED PIPE... It's Tight... It's Best... Costs Less!

Check 3869 opposite last page

ENGINEERING & SAFETY

Operating within line pipe line booster pump stops motor damage

Uses: As submersible pipe line booster pump.

Features: Unit operates in horizontal position within pipe line itself. It eliminates motor damage from heat, dust, and moisture.

Description: Design of submersible pipe line booster pump enables pump to be suspended within special section of pipe line. Section is flanged at each end and becomes an integral section of pipe line.

Motor is centered and firmly held by special spiders within this section. Line liquid is drawn past motor and into bowl assembly which passes it along at greatly increased pressure. Submersible power cable leads to terminal box mounted on outside of special section, and from there runs to control box.

Pump is available in sizes designed to operate within pipe from 8 to 24". It will give capacities from 100 to 4000 gpm in heads ranging from 50 to 500 ft.

("Power-line" booster pump is product of Layne & Bowler Pump Co., Vail at Sycamore, Los Angeles 22, Calif.)

Check 3870 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

Gives early warning of overheat condition

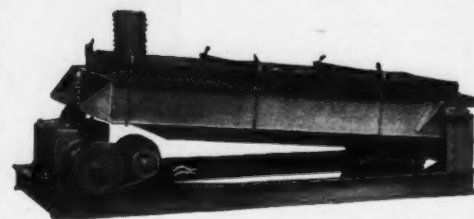
Uses: As overheat-fire detector.

Features: In addition to giving prompt alarm to dangerous temperature rise, detectors monitor temperature along every inch of strand. Simplicity and flexibility of detection system makes it extremely easy to install and almost maintenance free.

Description: Strips of con-

ROTEX®

SCREENERS GIVE



PROFITABLE PRODUCTION!

ROTEX FEATURES

- Low head room
- No screen blinding
- Fast screen changes
- Dependable service
- Dust-tite construction
- Rugged construction

For over 40 years ROTEX Screeners have been widely used throughout industry. Today there are installations in the United States and over 25 foreign countries. Built for dependable service, ROTEX are long known for accuracy, capacity and operating economy.

ROTEX SCREENING ACTION:

The nearly level, gyratory motion, pioneered in ROTEX, conveys materials rapidly over screen surfaces with minimum vertical vibration or hop. This stratifies the material by particle size, rapidly passing undersize particles through the mesh openings. The results are clean separations of exacting accuracy coupled with high capacity. Designed for operating convenience, ROTEX Screeners pay for themselves by the economies they effect.

ROTEX WIDE SELECTION:

To meet your requirements: 25 standard models—one to five screen surfaces—many semi-standard and special models—sanitary and all-metal construction available.

Write for Bulletin 401 and information on your screening requirements. Our engineering staff will be pleased to cooperate with you.

MECHANICAL FEATURES

All Metal Screen Box
Self-Aligning Slide Bearings
Quiet Running Counter-Balanced Drive
Heavy Welded Structural Steel Base

ROTEX

The Orville Simpson Co.

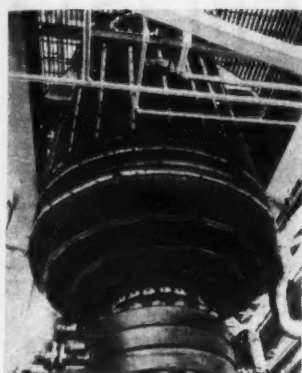
1246 Knowlton St., Cincinnati 23, Ohio

Check 3871 opposite last page

CHEMICAL PROCESSING

ENGINEERING & SAFETY

tinuous overheat system come in variable lengths up to 20' and are coupled together to form longer strands. They are of flexible Inconel tubing which contains two wires imbedded in a ceramic, thermistor core. Tubing is attached to surface of equipment in pat-



Simple, flexible continuous strip detection systems are easy to install and almost maintenance free

terns dictated by degree of overheat coverage desired and shape of equipment.

At normal operating temperatures, the ceramic offers high resistance to flow of current between two conductors. At temperatures above this point, resistance drops rapidly. When predetermined resistance is reached, monitoring control unit causes an alarm to sound. When temperature returns to normal, resistance rises and alarm automatically shuts off.

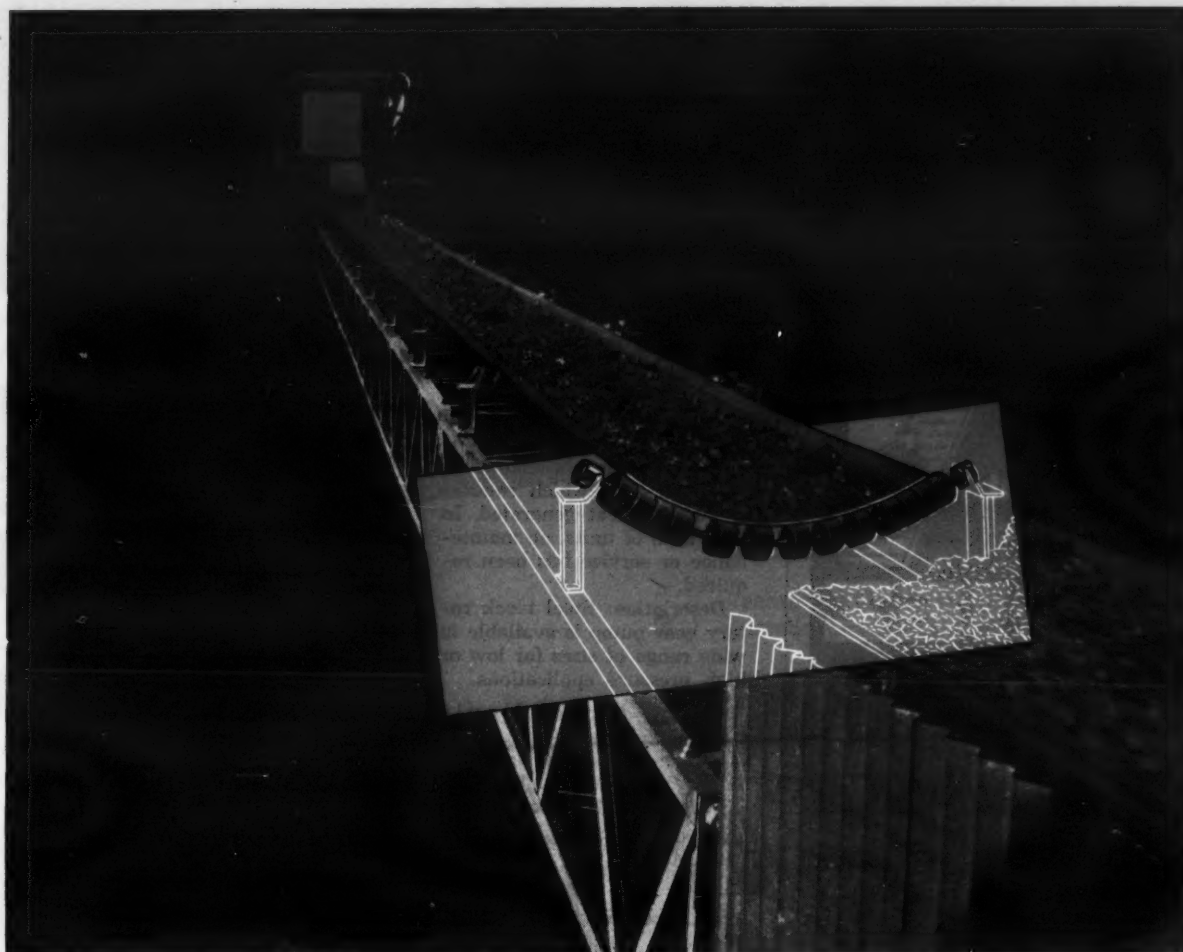
Continuous strip overheat detectors have an alarm range of from 200-1000°F. Strips can be subjected to temperatures as low as -65°F.

(Continuous strip overheat systems are product of Walter Kidde & Company, Inc., 260 Madison Ave., New York 16, New York.)

Check 3872 opposite last page.

Stainless steel sanitary fittings, valves, tubing, and tube-holder assemblies are illustrated and described in 24-page leaflet — Terriss Division, Consolidated Siphon Supply Co., Inc., 22 Wooster St., New York, N. Y.

Check 3873 opposite last page.



JOY LIMBEROLLER... THE easy going BELT CONVEYOR IDLER WITH PLENTY OF BACKBONE

Radically different from all other idlers, the Joy Limberoller is a flexible steel cable suspended between two sealed bearings... neoprene discs are molded to the cable... forming a single roll idler which turns on its own axis. This imparts a flexing action which is self-cleaning... prevents material build-up, a source of trouble with conventional idlers.

The Joy Limberoller idler supports the belt across its entire width in a true catenary... doesn't bend or pinch the belt between steel rolls like conventional idlers. Hard materials don't "bump along" from idler

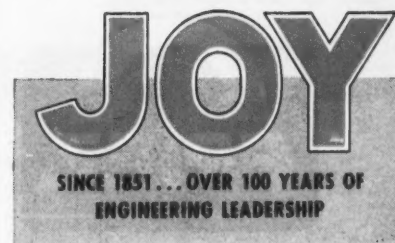
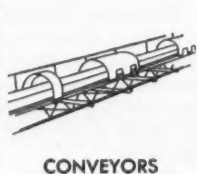
to idler, either. Belt life is increased 20% and more.

Abrasive or corrosive materials are no problem, because only two bearings are used. They are up out of the dirt zone, not hiding down under the belt where inspection and maintenance are difficult. Joy Manufacturing Company has never replaced a single bearing due to normal failure. Heard enough? Get the whole story from:

Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa. In Canada: Joy Manufacturing Company (Canada) Limited: Galt, Ontario.

W&W L7373-249

Write for Free Bulletin 269-80

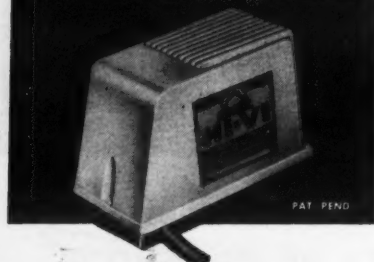


Check 3874 opposite last page

Hopper Bopper

...new
electro-
permanent
magnetic

ERIEZ
HI-VI
BIN VIBRATORS



Here's the newest and most efficient answer to those hard-to-move materials in sticky bins... designed to provide superior operating efficiency... exclusive pinpointed vibration gets right to the trouble spot—starts stubborn materials moving!

NO RECTIFIER NEEDED • JUST PLUG OR WIRE INTO A.C. LINE • COMPLETELY ENCLOSED HOUSING ASSURES LONG TROUBLE-FREE LIFE • GREATER VIBRATION IMPACT THAN COMPARABLE SIZE UNITS • LOW FIRST COST • LOW OPERATING, MAINTENANCE COST.

Also available: Special Mill Mutual ACCEPTED Units for HAZARDOUS DUSTY LOCATIONS.

GET BIG VIBRATORY FACT FILE... WRITE TODAY.

Eriez Mfg. Co., 73-PA Magnet Dr., Erie, Pa.

**UNSTICK
STUCK BINS**

ERIEZ

Check 3875 opposite last page

ENGINEERING & SAFETY

Tops four difficulties when pumping liquid CO₂

Pump does not require lubrication, adjustment

Uses: For pumping of CO₂ from bulk delivery trucks to dockside cylinders or systems.

Features: Because of its design, pump requires no separate lubrication. Also, special operating adjustments are not required. Extended "cool-down" time is eliminated by design feature which reduces amount of heat generated. In field tests of units, no maintenance or service has been required.

Description: Steel block rotary gear pump is available in wide range of sizes for low or high pressure applications.

(Northern Nitralloy liquid CO₂ pump is manufactured by Northern Ordnance Incorporated, Columbia Heights P.O., Minneapolis 21, Minn.)

Check 3876 opposite last page.

Packaged boiler unit steams up 100,000 lb or more per hour

Claimed to cut costs 20%

Uses: For steam generation.

Features: Unit is said to be first of its kind capable of generating steam at capacities up to 100,000 lb or more per hour. According to company, cost of units is approximately 20% less than conventional units of similar capacities.

Description: Line of natural circulation packaged boilers requires no recirculating pumps, simplifying operating and maintenance problems. Practically the entire furnace and boiler envelope is water cooled. A minimum amount of refractory material is required.

Boilers are designed to operate at steam pressures ranging from 250 to 775 lb per sq in. Wide furnace allows adequate burner clearance, contributing to complete combustion throughout range of capacities. Pressure-firing design eliminates need for induced draft fan.

Boilers are designed to burn either oil or gas, or a combination of both fuels. If dual-fuel burner is installed, standby fuel becomes instantly available. This avoids both a boiler outage and a drop in steam pressure when fuels are changed.

("B&W Packaged Boilers, Series 100-OG" are product of the Babcock & Wilcox Co., 161 East 42nd St., New York, New York.)

Check 3877 opposite last page.

Tout rubber compound for good resistance to abrasion, corrosion

Uses: Material designed for use in pressure and vacuum systems handling abrasive or corrosive liquids, slurries, suspensions and solids.

Features: Abrasive and corrosive-resistant rubber pipe has flex life that has surpassed previously installed units.

Description: Special abrasive- and corrosive-resistant rubber compound for expansion joints and pipe installations is available in standard sizes from ½ to 72" I. D. with either duck and rubber or duck and neoprene integral full-faced flanges or integral "Gen-Lok" ends. Pipe is available in any length up to 50'.

("Tuf-Flex" rubber pipe is development of General Rubber Corporation, 52 Summit St., Tenafly, N.J.)

Check 3878 opposite last page.

High shear strengths at high temperatures adhesives feature

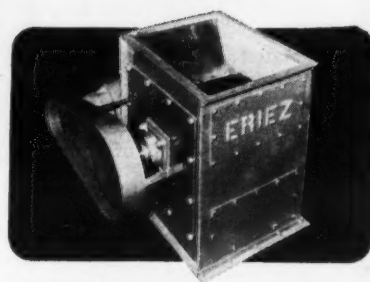
Uses: For rubber-to-metal, plastics-to-metal, metal-to-metal and friction materials bonding.

Features: According to manufacturer, these materials have greater shear strength at high temperatures than any other comparable material. At 600° F, their shear strength is 495 lb/sq in.

Description: Family of three synthetic-rubber, phenolic-

**UP TO
50%
STRONGER
than
old-style drums!**

ERIEZ
non-electric
**MAGNETIC
DRUMS**



New, expanded line provides more magnetic power, increased protection! For automatic continuous removal of medium fine iron and tramp iron from foods, grains, plastics, rubber, ceramics, etc. Protects machinery, prevents fires and explosions, eliminates product contamination. Quickly, easily installed at discharge end of chutes, spouts, screw conveyors, etc. Now with replaceable shell and bearings to eliminate costly maintenance problems!

MAGNETIC POWER GUARANTEED INDEFINITELY — NO LOSS OF MAGNETIC STRENGTH WHEN OPERATED IN HIGH OR LOW TEMPERATURE INSTALLATIONS — Non-electric; no wires, attachments or fuses — No operating or maintenance costs — For wet or dry materials — Self-cleaning — With or without housings — Adjustable magnetic element; easy drum removal — Wide range of models and sizes.

WRITE TODAY FOR DESCRIPTIVE LITERATURE INCLUDING INSTALLATION AND APPLICATION INFORMATION
Eriez Mfg. Co., 73-PB Magnet Dr., Erie, Pa.



Check 3879 opposite last page

CHEMICAL PROCESSING

resin-base adhesives are all thermosetting. They differ from each other only in the percentages of solids they contain, providing a choice of viscosities.

The adhesives are resistant to all oils, brake fluids, solvents, and water. They have excellent resiliency and ability to withstand shock. Adhesives are completely cured with any of the following combination of bond-line temperatures and curing time: 325°F for 15 minutes; 350°F for 10 minutes; and 400°F for five minutes.

(Ray-BOND R-81001, 81002, and 81114 are products of Adhesive Dept., Raybestos-Manhattan, Inc., Bridgeport 2, Conn.)

Check 3880 opposite last page.

**Space, weight factors
prime consideration
in control design**

Uses: For operation in hazardous locations.

Features: Unit has been designed to be used where space and weight are an important factor in control installations. It is listed by Underwriters Laboratories, Class 1, Group C and D, Class 2, Group E, F, and G, (Nema 7-9A). Visible hermetically sealed mercury switch permits instant knowledge of whether switch circuit is on or off.

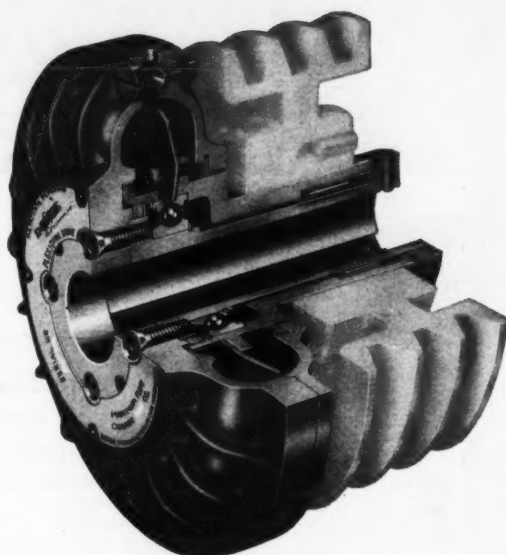
Description: Pressure control has external adjustments for setting operating range and a visible calibrated dial. Finished in natural aluminum, dimensions of unit are: Width 7 $\frac{3}{4}$ ", overall height including pressure connection 9 $\frac{7}{8}$ ", and depth 5". Weight is approximately 8 lb.

Control is available in 21 operating ranges from 0-30" vacuum to 0-1000 psi. External pressure is $\frac{1}{2}$ " and internal pressure is $\frac{1}{4}$ ". Surface or panel mounting is possible, and either breather or drain is available.

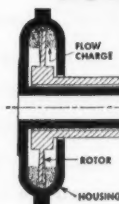
(Pressure control is product of The Mercoid Corp., 4201 Belmont Ave., Chicago 41, Illinois.)

Check 3881 opposite last page.

WHAT'S YOUR PROBLEM?...



HOW FLEXIDYNE WORKS



The "dry fluid" in Flexidyne is tiny heat-treated steel shot. A measured amount, called the "flow charge," is contained in the housing, which is keyed to the motor shaft. Inside the housing is a rotor, free to revolve relative to the housing, but connected to the load.

When the motor is started, centrifugal force throws the flow charge to the perimeter of the housing, packing it between the housing and the rotor, which transmits power to the load. Initial slippage is momentary. Housing and rotor become locked together and achieve full load speed without slip and at 100% efficiency.

CALL THE TRANSMISSIONEER — your local Dodge Distributor. Factory trained by Dodge, he can give you valuable help on new, cost-saving methods. Look in the white pages of your telephone directory for "Dodge Transmissioneer."



- ☒ Overheated motors?
- ☒ Excessive belt maintenance?
- ☒ Breakage of materials being processed —like thread, wire, paper?
- ☒ Expense of oversize or high torque motors?
- ☒ High demand rate?
- ☒ Expense of reduced voltage starters?
- ☒ Clutch trouble?
- ☒ Breakage of transmission parts due to instantaneous shock loads?
- ☒ Damage and recurring down-time from overloads?

FLEXIDYNE

THE DRY FLUID DRIVE

It is no longer necessary to accept the destructiveness—the costliness—of conventional starting in the mechanical transmission of power. Flexidyne changes that!

Flexidyne is the new way to start loads *smoothly*—to protect against shock and overload—to save power—all *without any sacrifice of efficiency at full load!*

This revolutionary development is ushering in "the day of the soft start"—which can mean thousands of dollars to you in equipment savings and in better, more economical operation.

Flexidyne is available, off the shelf, in Drives and Couplings. Capacities range from fractional to 1,000 hp. Ask your local Dodge Distributor or write us for technical bulletin.

DODGE MANUFACTURING CORPORATION, 6200 Union St., Mishawaka, Ind.

DODGE

of Mishawaka, Ind.

Check 3882 opposite last page

ENGINEERING & SAFETY

Protects hands, arms from chemical irritants, eases wash-up

Uses: As protective coating against acids, alkalis, and other chemical irritants.

Features: Material prevents skin discoloration and irrita-



Protective barrier between skin and chemical irritant spreads on like a cream, but acts like a glove that is invisible, strong, and as elastic as the skin itself

tion. It makes after work wash-up easier and faster.

Description: Greaseless, stainless cream is applied to hands and arms before contact with chemical irritants. Forming a "protective glove" cream dries quickly after application and lasts a long time.

Cream is available in two formulas, for dry work and for wet work.

(Kerodex 51 and Kerodex 71 are products of Ayerst Laboratories, 22 East 40th St., New York 16, New York.)

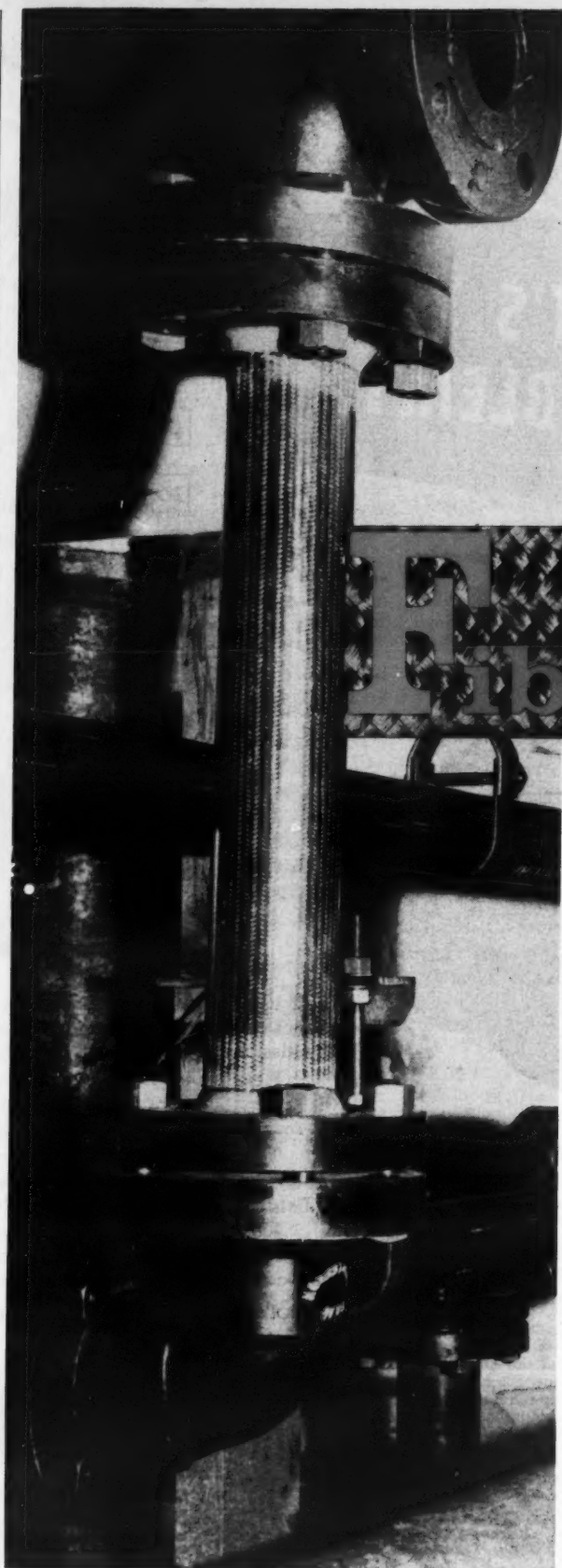
Check 3883 opposite last page.

Uniform cone spray at low pressures

Uses: For discharging large quantities of liquids at low pressures.

Features: Nozzles produce medium to coarse, evenly distributed, solid-cone sprays with normal spray angle of 70°.

Description: Spray nozzles are available in ten orifice sizes to provide wide range of capacities. With water supplied at 10 psig, smallest nozzle will discharge 1.2 gpm and largest 120 gpm. With pres-



*in production of
spectacular
new . . .*

TYREX

*tire
cord*

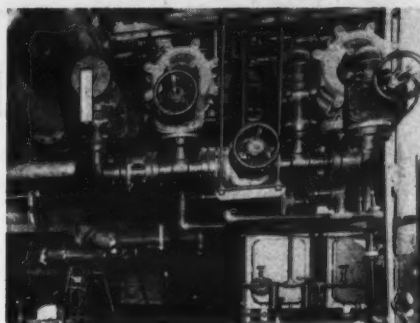


FIBERCAST

pipe

WHAT IS FIBERCAST?

FIBERCAST is a centrifugally cast thermoset Epoxy Resin Reinforced Pipe with multiple layers of seamless braided glass fiber sleeving. The scientific selection of the two materials combines in one integral resin body, the glass fibers perfectly arranged, imbedded and bonded, resulting in high strength and long service life pipe and tubing, capable of high temperature and pressure operations.



Left: Showing the ease of inplant fabrication of Fibercast Pipe and Fittings by plant personnel.

Above: Typical installation of plant fabricated Fibercast assemblies.

Below: Fibercast Pipe drilled and tapped for special application.

easily handles extremely hot, corrosive solutions

Months of laboratory and test-track punishment have proved — the hard way — that Tyrex viscose cord now gives tire makers what they need to produce the toughest, most rugged and long-wearing tires. In the production of this revolutionary new Tyrex cord, a leading producer had to transport corrosive liquids at extremely high temperatures, so hot that the pipe had to be insulated. Solving this problem was Fibercast pipe and fittings made from thermosetting reinforced epoxy resins. They found Fibercast met all the rigid job specifications and enabled quality production at top rates.

Check these features of Fibercast's Piping-Tubing-Fittings and see what they can do to help speed up your processes where corrosion and/or high temperatures present production problems:

- Operating temperature — 65° to 300° F... widest range of any high-strength, non-metallic pipe.
- Operating pressures to 1000 p.s.i.
- Radius of curvature approximately 10°.
- Linear coefficient of thermal expansion 7.06×10^{-6} to 8.25×10^{-6} in./in./° F essentially the same as steel.
- Readily handles hot acids, alkali, caustics, etc.
- No electrolytic action. A non-conductor... accepted by the electrical industry as a superior insulator.
- Support spans — nominal 18'.
- Light weight and high strength... less than $\frac{1}{4}$ the weight of steel.
- Low coefficient of heat transfer — 3.0×10^{-4} Cal./CM²/sec./CM/° C — saves heat and cold losses in processing.
- Out of 338 common corrosive solutions Fibercast handles 320 — service life of Fibercast generally exceeds that of more expensive piping.
- 3 major systems of joining — standard flanged — cemented — threaded and coupled with complete line of fittings.
- Smooth interior with a Hazen-Williams C Factor-147.

Remember, no other non-metallic pipe has all the desired advantages found in Fibercast. Its unique and exclusive construction, using high quality materials, is processed under rigid controls. This combination results in a high-strength, high-temperature, non-corrosive pipe unequaled in any application.

* TYREX viscose tire cord is the newest cord developed for tires, and

represents a major scientific break-through. TYREX is a certification mark of Tyrex, Inc. |

FIBERCAST COMPANY

A Division of The Youngstown Sheet and Tube Company

Box 727, Sand Springs (Tulsa), Oklahoma

Phone Circle 5-1301

TWX — Sand Springs 480



Check 3884 opposite last page

ENGINEERING & SAFETY

sure increased to 100 psig, the discharge rates are 3.75 and 375 gpm, respectively. At the other extreme of the pressure scale, the nozzles will produce solid-cone sprays with uniform distribution at pressures as low as 3 psig.

(Spray nozzles are product of Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.)

Check 3885 opposite last page.

Pump heavy, fine slurries with low-speed vertical unit

Uses: For submerged operation in wet pit sump service.

Features: Low-speed unit operates with continuous duty on both heavy and fine slurries. Since only four bolts clamp liquid end of the pump, it can be quickly dismantled. There is no stuffing box or vapor binding.

Description: Vertical heavy-duty slurry pump is available in 9 models varying from 2 to 8' in size. All wearing parts are interchangeable with manufacturer's horizontal pump unit. Bearings are water lubricated (grease is optional).

(Type RXV slurry pump is product of Morris Machine Works, Baldwinsville, N.Y.)

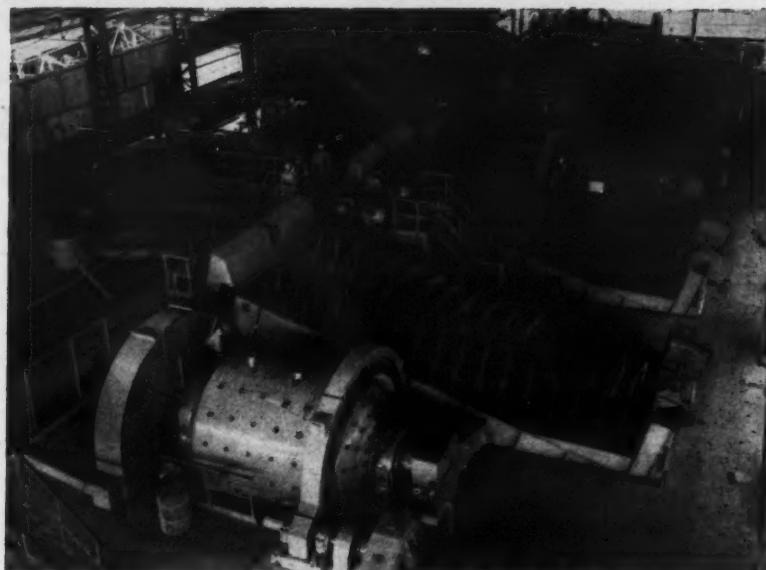
Check 3886 opposite last page.

Resists liquid fuels permits lubrication of pumps, bearings

A new type of grease highly resistant to most fuels and solvents has been developed. It is said to be impervious to the washing action of a wide range of petroleum, coal tars and chlorinated liquids. According to manufacturer, grease permits normal lubrication of pumps, bearings, and sliding surfaces that must operate in the presence of solvents and liquid fuels.

(Grease is development of Pennsylvania Refining Co., 2686 Lisbon Rd., Cleveland 4, Ohio.)

Check 3887 opposite last page.



Shown here are four Hardinge 9-3-6-8 Tricone Mills grinding sulfide copper ores and mixed ores in a concentrating plant in the Belgian Congo, Africa.

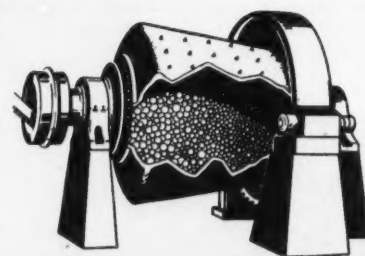
CORRECT BALL SEGREGATION in the *Hardinge* TRICONE MILLS



Shop view of a 10½' Tricone with 9' long tapered shell.

Every ball in the Hardinge Tricone Mill "minds its own business!"

Complete specifications upon request, Bulletin AH-414-13



Highest grinding efficiency and lowest ball and lining wear are common to mills with a correctly segregated ball charge. The Hardinge Tricone Mill is the only mill providing these essentials to low cost operation without the use of special linings or internal devices, which are subject to wear and are effective through only a part of their wearing life. The Tricone also occupies less floor space for its grinding volume than any other ball mill built.

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Check 3888 opposite last page



recent books

reviews of current technical and reference work
... summarized for you by authorities in the
field with the CP staff

Chemical Reaction Engineering

Reviewed by
D. S. DAVIS
University of Alabama

"Chemical Reaction Engineering," a 200-page book, is a collection of papers presented in May 1957 at Amsterdam. It represents the first European symposium on chemical engineering. Three introductory papers are followed by three on transport phenomena in heterogeneous reactions, three on non-uniform concentration distributions, three on reactor efficiency and stability, and two on reactor development.

One paper is in French, four are in German, and nine are in English. All bear summaries in the three languages. Opening and closing addresses for the symposium are included.

This highly mathematical book, edited by Dr. K. Rietema, secretary of the European Federation of Chemical Engineers, contains clear line cuts and is printed in double-column form.

To obtain "Chemical Reaction Engineering" remit \$12.50 direct to Pergamon Press, Inc., 122 East 55th Street, New York 22, New York.

Check 3889 opposite last page.

with the theorems. Only a few problems have been included.

An attempt has been made to make the presentation mathematically rigorous. However, only two chapters call for a knowledge of differential and integral calculus. The reader should have knowledge of elements of analytical geometry to tackle the book at all.

Drawing from quite a few foreign references, the author does present some material heretofore unpublished in book form.

Subjects covered include: determinants, types of nomographs, projective and non-projective transformations, matrix multiplication, empirical nomography, and Kellogg's method.

To obtain "Nomography", remit \$4.50 direct to Interscience Publishers, Inc., 250 Fifth Avenue, New York 1, N. Y.

Check 3890 opposite last page.

Plant Design & Economics for Chemical Engineers

Reviewed by
DR. JAMES H. GARY
University of Alabama

In "Plant Design and Economics for Chemical Engineers," author Max S. Peters emphasizes the cost side of plant equipment design by devoting the first half to the principles of applied economics. Such topics as operating costs, interest, investment costs, taxes, insurance, depreciation, alternative investments, and replacements are covered in detail sufficient to give background for evaluating costs of alternative equipment design and to aid in selecting the most desirable type.

A number of problems are included at the end of each

Nomography

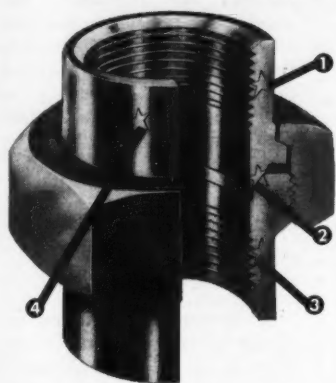
Although there are numerous books on how to construct nomographs (or nomograms, as some prefer to call them), not too much published material on underlying theory exists.

This 134-page book by L. Ivan Epstein of Lowell Technological Institute approaches the subject from a purely theoretical standpoint. However, in his discussions, the author has combined methods of construction clearly and concisely



only CATAWISSA

*gives you all these
features for your
forged steel pipe
union requirements*



1. Uniform walls for even expansion and contraction under temperature changes. They follow the pipe!

2. Catawissa Ball-to-Angle Seats give you a "Perfect Seal" regardless of pipe alignment!

3. More than adequate wall thicknesses give you Catawissa's 3-to-1 Safety Factor (3000-lb. service, 9000-lb. test; 6000-lb. service, 18000-lb. test)!

4. Round, straight barrels for fast wrenching. No uneven or tapered surfaces to cause wrench slips or wrench locking!

Catawissa Perfect Seal Pipe Unions are made by Union Specialists from 80,000 lb. tensile strength steel (ASTM Spec. A-105-55T, Grade II). Steel forgings from our own forging mill are closely checked for imperfections . . . and finishing on modern, automatic machines with close inspection during and after production give you pipe unions second to none!

Write for Catalog 58 showing the complete Catawissa line of Perfect Seal Products.

for complete, guaranteed satisfaction

... always specify
CATAWISSA

CATAWISSA VALVE & FITTINGS CO.
CATAWISSA • PENNSYLVANIA

Check 3891 opposite last page

FEBRUARY 1959

RECENT BOOKS

chapter dealing with these subjects. Examples also are used throughout the text to illustrate applications of economic principles. Last half of book treats equipment design methods, cost estimation, and design report preparation.

Such aspects of plant design as plant location, plant layout, selection of continuous or batch process, instrumentation, structural design, and waste disposal are rather inadequately covered in a few sentences or paragraphs.

This 511-page volume is a valuable reference on application of economic principles to chemical engineering equipment design.

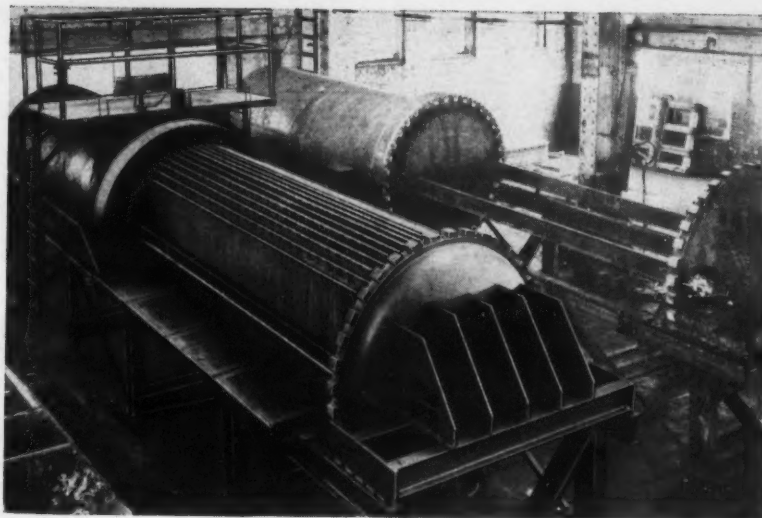
To obtain "Plant Design and Economics for Chemical Engineers" remit \$11.00 direct to McGraw-Hill Book Company, 330 West 42nd Street, New York 36, N. Y.

Salary Administration and Intangible Rewards for Engineers & Scientists

This book is actually two books in one. Its 189 pages contain the first two of a series of reports made on a study to determine the vocational needs, goals, and job satisfactions of engineers and scientists. Written by John W. Riegel, professor of industrial relations, University of Michigan, it cites results obtained from interviews with more than 400 persons.

First section of book is devoted to administration of salaries. Consisting of 105 pages, this portion discusses salary structures, salary adjustments, importance as motivating factor, etc. Second part of book contains 84 pages dealing with intangible rewards, such as professional recognition, privileges, freedom of action, opportunities to learn, etc. Each section is divided into four chapters. There is a handy index at end of each section.

The study was conducted by the University of Michigan's Bureau of Industrial Relations in 10 well-established firms. Persons interviewed included



G-B Retractable Shell-Type Filter Clarifies green Sodium Aluminate Liquor

This new filter, the retractable shell, is designed for filtering under pressure. Originally developed for the aluminum industry, this unit has proved to be extremely successful for clarifying green sodium aluminate liquor. Perhaps the most unique feature is the fact that filtrate lines need never be broken, but are permanently connected to achieve high pressure filtration without leakage. The retractable shell filter is available now for all types of process problems. Pressures up to 100 psig, sizes to 3000 sq. ft. Generally constructed of steel; however, it can be built from stainless steel and other specified metals.

Write for more complete information.



GOSLIN-BIRMINGHAM
MANUFACTURING CO., INC.
BIRMINGHAM, ALABAMA

**FILTERS • EVAPORATORS
PROCESS EQUIPMENT
CONTRACT MANUFACTURING
including HEAVY CASTINGS**

Check 3892 opposite last page



LOW-COST SECURITY FOR YOUR CHEMICAL LINES . . .

LAPP SOLID PORCELAIN VALVES WITH TUFCLAD® ARMOR

Install Lapp Solid Porcelain acid proof valves and have that trouble-free chemical line you want—at a cost well within budget. With Lapp Valves in your system, you have the assurance of *purity, protection and permanence.*

Because of its many special characteristics, Lapp Chemical Porcelain is the *ideal material* for maintaining *strict purity.* It is chemically inert, therefore resistant to corrosion from acids of all concentrations (except hydrofluoric); it's hard, dense, pure, homo-

geneous, close-grained and non-porous. Impregnated and bonded to this porcelain by an Epoxy resin of high strength and chemical resistance is an armor consisting of multiple layers of strong fiberglass. This serves as an insulator against thermal shock, a cushion to accidental impact and is strong enough to hold operating pressure even if porcelain is fractured. Built-in seating handle, solid Teflon packing, spring washers, malleable iron trim and brass stud and bushing are other advantages that make Lapp Valves well worth your investigation.



WRITE for description and specifications.
Lapp Insulator Co., Inc., Process Equipment
Division, 2103 Chestnut St., LeRoy, N. Y.

Check 3893 opposite last page

RECENT BOOKS

44 engineering and research executives, 91 supervisors, and 276 non-supervisory engineers and scientists.

Interviews were conducted on an anonymous basis. However, actual quotations from interviewees appear throughout the book. Written in an easy-to-read style, the work includes charts and tables, and is guaranteed to make interesting and informative reading for technical and non-technical men alike.

To obtain "Administration of Salaries and Intangible Rewards for Engineers and Scientists" remit \$6.00 direct to Publications Distribution Service, the University of Michigan, Ann Arbor, Mich.

Check 3894 opposite last page.

The Chemical Behavior of Zirconium

A broad and detailed account of the chemistry of zirconium as an element and as a component of compounds, interstitial solutions, and alloys is contained in a 398-page book written by Warren B. Blumenthal. The author is chief of chemical research, Titanium Alloy Manufacturing Division of National Lead Company, Niagara Falls, N. Y.

In addition to broad coverage of the subject as related to an element and a component, Mr. Blumenthal also lays down basic rules he has formulated that govern their properties. It is not the author's intention to imply that these rules are final. Instead, one feels their existence is a challenge to criticism and refinement in their formulation.

Mr. Blumenthal uses descriptions of the preparation and properties of zirconium-containing substances, their uses, and measured and deduced details of their structure and the nature of their chemical bonding.

To obtain "The Chemical Behavior of Zirconium," remit \$11 direct to D. Van Nostrand Company, Inc., 120 Alexander St., Princeton, N. J.

Check 3895 opposite last page.



new literature

Filter bibliography (with index) of over 230 reported applications, printed abstracts of significant bibliographic references, specific recommended procedures in major fields, and booklets and visual aids for training uses are contained in company publication. Filter bibliography — Millipore Filter Corporation, Watertown 72, Mass.

Check 3896 opposite last page.

Chemical index of eight pages contains complete list of products offered by this company. Twelve chemicals are new in this fourth edition and 20 other changes have been made. "Reilly Chemical Index"—Reilly Tar & Chemical Corporation, Merchants Bank Building, Indianapolis 4, Ind.

Check 3897 opposite last page.

Pipe insulation of lightweight glass fiber for temperatures ranging from sub-freezing to 350°F is detailed in eight-page folder. Physical properties, thermal conductivity, guide to specifications for application and finishing, and dimensions are provided in Form WPN-2 — L. O. F. Glass Fibers Company, 1810 Madison Ave., Toledo 1, Ohio.

Check 3898 opposite last page.

Thermocouple assemblies, custom-built for individual applications, are described in engineering data bulletin. These long, multi-thermocouple assemblies are suggested for use in deep vessels, reactors, catalyst beds, furnaces. Details and application advantages are given in the 12-page Bul EDS-47 — Thermo Electric Co., Inc., Saddle Brook, N. J.

Check 3899 opposite last page.

Chemical processing equipment, including filters, demineralizers, heat exchangers, pumps, and waste treatment systems are described in 6-page bulletin. Characteristics and suggested applications for individual units are listed. Bul GEN-58 — Industrial Filter & Pump Mfg. Co., 5912 Ogden Avenue, Cicero 50, Illinois.

Check 3900 opposite last page.

Material handling case history of how one of the world's three largest liquor wholesalers increased speed of material handling operation in its warehouse by 75% is presented in six-page case history Bul 509-1 — Lewis-Shepard Products, Inc., Dept R8-19, 125 Walnut St., Watertown, Massachusetts.

Check 3901 opposite last page.

Thermometers, heavy-duty bimetal type, are detailed in catalog that provides complete information on features, ranges, etc. Cat 09-100 — Weston Instruments, Division of Daystrom, Inc., Newark 12, New Jersey.

Check 3731 opposite last page.

Aluminum rigid conduit—its mechanical and electrical advantages —is outlined in 12-page, four-color descriptive brochure. Form 17-10283—Aluminum Company of America, 749 Alcoa Bldg., Pittsburgh 19, Pa.

Check 3902 opposite last page.

Vinyl processors have another tool for enhancing salability of products in new concentrated synthetic pearl paste which lends conventional high lustre lead type color widely used in industry. Tech. Bul 47P — Claremont Pigment Dispersion Corporation, 39 Powerhouse Rd., Roslyn Heights, Long Island, N.Y.

Check 3903 opposite last page.

Pump and motor units for hydraulic, pressure feed, transfer work with .3 to 55 gpm at rated maximum pressure are described in eight-page illustrated bulletin. Performance, dimensions, and application data are provided in Bul 31 — Roper Hydraulics, Inc., 340 Blackhawk Park Ave., Rockford, Illinois.

Check 3904 opposite last page.

Copper hydrate complex technical bulletin of four pages describes product and lists formula, specifications, precautions, suggested uses, and physical properties. Tech Bul CHC-1 — Henry Bower Chemical Manufacturing Co., Gray's Ferry Road and 29th St., Philadelphia 46, Pa.

Check 3905 opposite last page.

Non-skid veneer designed to eliminate slipping on stairs, catwalks, ramps, and other areas is described in two-page data sheet. X-L Veneer data sheet — Dept. E. I. B., The Monroe Company, Inc., 10703 Quebec Ave., Cleveland 6, Ohio.

Check 3906 opposite last page.

Production savings, by multistage centrifugal blowers and exhausters are explained in manufacturer's Booklet AB-104 — Dept. C-1, Air Appliance Div., U.S. Hoffman Machinery Corporation, 103 Fourth Ave., New York 3, N. Y.

Check 3698 opposite last page.

Industrial bulletins pertinent to the reader . . . offering data on products, processes, services. Additional reviews of catalogs, bulletins, data sheet, etc., are found throughout other sections of this magazine

Inert gas producing equipment (packaged) is described in four-page brochure. Included are inert gas, nitrogen, and carbon dioxide generators, carbon dioxide removal units, gas purifiers, gas drying equipment, and compressors, and storage systems. Inert gas producing equipment brochure — Southwest Industries, Inc., PO Box 19392, Houston 24, Texas.

Check 3907 opposite last page.

Bypass rotameters for measuring fluid rate of flow in pipelines 2" and larger are shown in 2-color, 4-page bul. Directions are given for selecting proper size bypass rotameter, including use of a permanent pressure loss chart. Bul 18B — Dept. M-I, Schutte & Koerting Co., Cornwell Heights, Bucks County, Pa.

Check 3908 opposite last page.

Metallic filter cloth of various meshes, sizes and shapes is illustrated and briefly described in four-page Bul 81 — Cambridge Wire Cloth Company, Cambridge, Maryland.

Check 3909 opposite last page.

Plasticizers-comonomers reference book presents, in a general way, physical and chemical properties of these materials. Individual technical data pages of 46-page book provide specifications for 26 plasticizers and seven comonomers. Other sections are devoted to performance data, application recommendations, and description of test methods. Spiral-bound volume is covered with clear plastic jacket, a product of company. Plasticizers-Comonomers Book — Rubber Corp. of America, Hicksville, N.Y.

Check 3910 opposite last page.

Anionic surface-actives, their properties and uses, are presented in 16-page booklet that also describes chemical derivation and gives formula. "Igepon Surfactants" — Antara Chemicals Division of General Aniline & Film Corporation, 435 Hudson St., New York 14, New York.

Check 3911 opposite last page.

Electronic digital computer's use in creating heat exchanger designs for a specific company is described in four-page application report. Typical data load sheet for programming input data of sample problem is illustrated. LGP Application Report No. 10 — Royal McBee Corporation, Port Chester, N. Y.

Check 3912 opposite last page.

How purifier removes valuable materials entrained in hot gas or air streams without loss of heat is described in four-page bulletin that features cutaway views of method used by purifier in reclaiming materials. Several different applications for equipment are detailed. Simple and economical means of removing 99.9% of solids from air pollutants is outlined in Bul 600 — Centrifex Corporation, 3608 Payne Ave., Cleveland 14, Ohio.

Check 3913 opposite last page.

Environmental chambers — thoroughly discussed and illustrated in 28-page bul. Technical information includes tables and charts of specific heats, metal shrinkage, convection fluids, temperature conversions, and standard atmospheric properties. Controlled atmospheric conditions — Webber Manufacturing Co., Inc., PO Box 217, Indianapolis 6, Ind.

Check 3914 opposite last page.

For handling non-abrasive, non-corrosive materials manufacturer claims its versatile medium is feeder, elevator, and conveyor combined in one unit. Information on space and cost savings may be obtained in Book 2475 — Link-Belt Company, Prudential Plaza, Chicago 1, Ill.

Check 3712 opposite last page.

Activated charcoal is the subject of recently published eight-page pocket-size pamphlet which tells in layman's language the manufacturing processes involved in making product and how it has developed for liquid and gas purification uses. "The Activated Charcoal Story" — Barnebey-Cheney Company, Columbus 19, Ohio.

Check 3915 opposite last page.

Conveyor elevator is subject of four-page bulletin which shows sanitary construction features and illustrates various types of buckets, pulleys, etc. Models, dimensions, and capacities are included. Conveyor elevator bul — The Bucket Elevator Co., 360 Springfield Ave., Summit, N. J.

Check 3916 opposite last page.

Fire information and advice are given in 16-page accordion-fold leaflet. Theme is safety procedures to follow in preventing fires. "Don't Be Alarmed" — National Safety Council, 425 North Michigan Ave., Chicago 11, Ill.

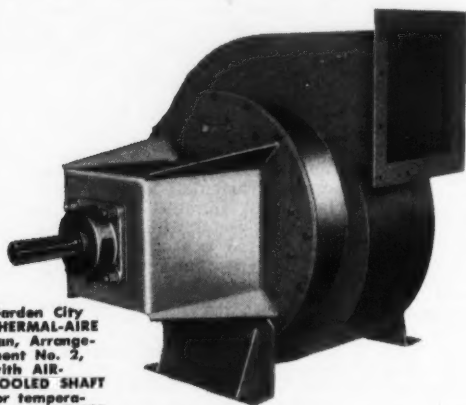
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RF THERMAL-AIRE FANS

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- temperatures to 1850°F.

Garden City's new RF THERMAL-AIRE radial blade fans are durable, trouble-free, efficient. Modern, simplified in design, they are "tailored" for various temperatures to precisely meet your needs.



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Check 3918 opposite last page

NEW LITERATURE

Roller chains and sprockets are thoroughly covered in comprehensive 154-page book of detailed engineering data illustrating roller chains, versatility and wide range of applications. Typical installation conditions, formulas, charts, and diagrams that simplify selection of proper chains for any application are provided. Table lists degree of resistance of stainless and bronze roller chains to almost 400 corrosive agents. Book 2657 — Dept. PR, Link-Belt Company, Prudential Plaza, Chicago 1, Ill.

Check 3919 opposite last page.

Wire cloth products and services are presented in 94-page catalog that describes nine basic weaves that can be made from any metal or alloy, including titanium. Wire cloth cat — Dept. F, The Cambridge Wire Cloth Co., Cambridge 2, Maryland.

Check 3830 opposite last page.

Drum dryers are described in 28-page bulletin that explains mechanical details of both atmospheric and vacuum dryers equipped with either single or double drums. Typical industrial applications are illustrated and tables of specifications and dimensions are included. Bul 384 — Bufllovak Equipment Division, Blaw-Knox Company, 1543 Fillmore Ave., Buffalo 11, New York.

Check 3920 opposite last page.

Magnetic equipment for protection against tramp iron is summarized in company bulletin which also provides information on heavy-duty equipment for purification and concentration of magnetically responsive materials. Magnetic equipment bul — Stearns Magnetic Products, Division of The Indiana Steel Products Company, 635 S. 28th St., Milwaukee 46, Wis.

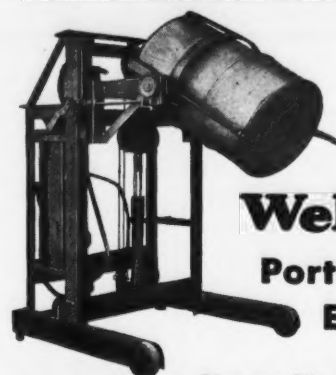
Check 3921 opposite last page.

How non-aqueous titrations can be performed with speed, simplicity, and much less equipment is explained in eight-page data sheet. Includes extensive bibliography. Data Sheet pH-83-MI — Beckman /Scientific & Process Instruments Division, 2500 Fullerton Road, Fullerton, Calif.

Check 3922 opposite last page.

Cobalt-60 23,000-curie facility is subject of 101-page report on its design and use. Report includes complete description of hot cell, design and assembly of source, dosimetry methods, and mathematical design of cylindrical sources. To obtain PB 131619, "Design and Use of a 23,000 Curie Cobalt-60 Facility", remit \$2.50 direct to the Office of Technical Services, United States Department of Commerce, Washington 25, D. C.

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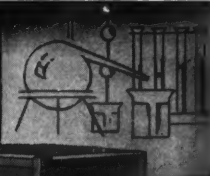
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this important time
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Check 3924 opposite last page

CHEMICAL PROCESSING

NEW LITERATURE

Resistance thermometers for temperatures up to 1000°F are fully illustrated in 36-page catalog. A convenient, tabular listing of specifications by application and design is given. A special section describes precision instruments for laboratory work. Cat EN-S4 — Leeds & Northrup Co., 4934 Stenton Ave., Philadelphia 44, Pa.

Check 3925 opposite last page.

Maintenance man's a minute man with battery-driven fork truck according to brace of bulletins offered by battery manufacturer. Step-by-step photos and instructions show recommended sequence for carrying out battery maintenance. Buls 5996 and 6207 — Exide Industrial Div., The Electric Storage Battery Co., PO Box 8109, Philadelphia, Pa.

Check 3926 opposite last page.

Safe solvent use in "cold cleaning" of metal parts is detailed in four-page report. New concept of a relative safety index for solvent evaluation, based on maximum allowable concentration, vapor pressure, and evaporation rate, is established. "Perclene® Perchloroethylene" — Chlorine Products Section, Electrochemicals Department, E. I. du Pont de Nemours & Co., Inc., Wilmington 98, Delaware.

Check 3927 opposite last page.

Rotary drum filter used for continuous operation in the process industries is detailed in 20-page bulletin. Some 50 photographs and drawings of five types of units are shown, along with operational data. Bul 7200 — Dorr-Oliver Incorporated, Stamford, Conn.

Check 3928 opposite last page.

Wire and powder sprayed coatings of metals and ceramics are discussed in basic engineering data bulletin of eight pages. Bul 136A — Metallizing Engineering Co., Inc., 1101 Prospect Ave., Westbury, Long Island, N. Y.

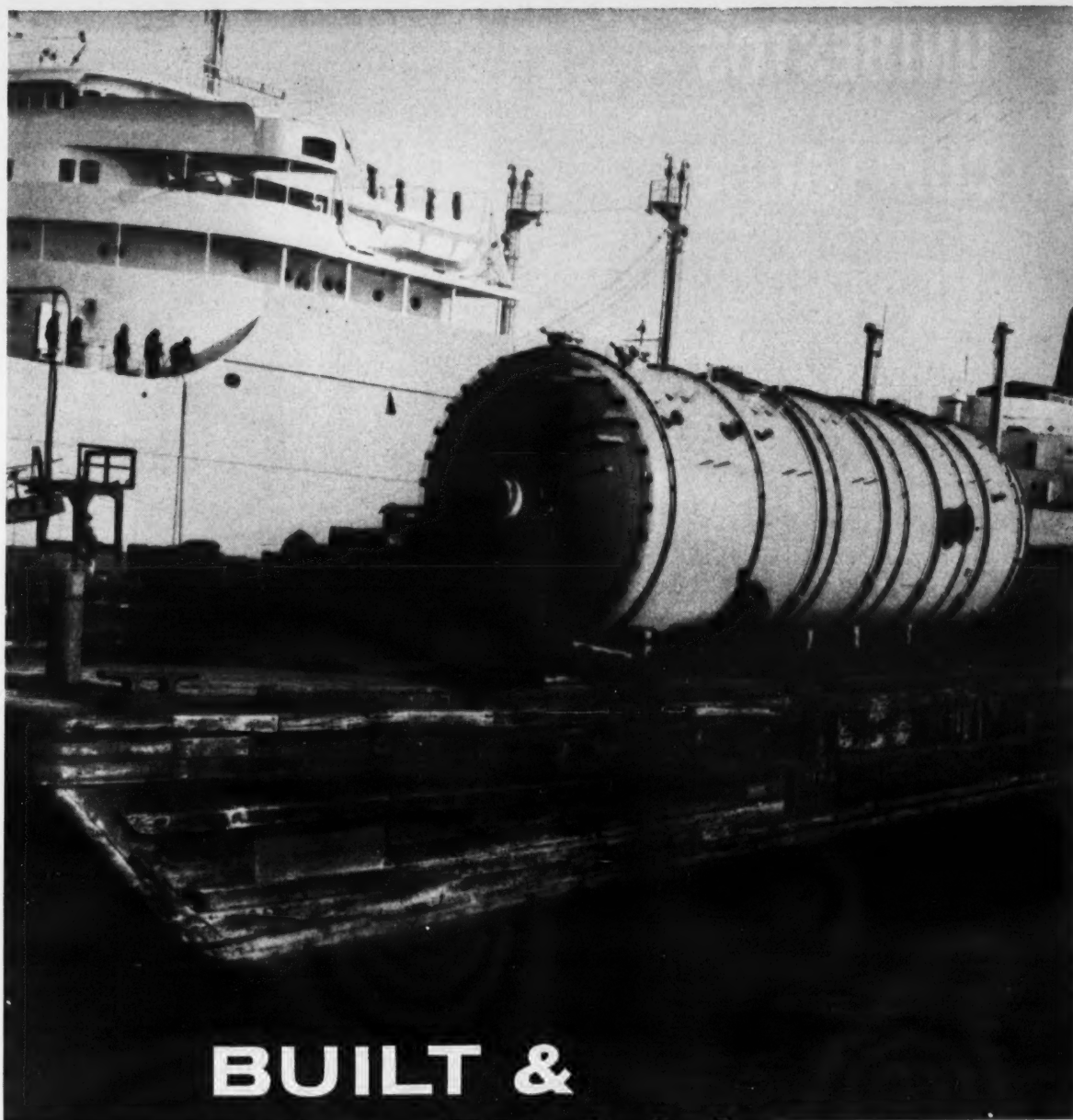
Check 3929 opposite last page.

Liquid-gas separation units for removal of entrained liquids and solids from air, gas, and steam systems are covered in Bul 142 — Selas Corporation of America, Dresher, Pa.

Check 3788 opposite last page.

Thermometers of acid-resistant 304 stainless steel, in five easily read dial sizes and 12 Fahrenheit or Centigrade ranges, are fully illustrated in eight-page Bul 13E — W. C. Dillon & Co., Inc., 14620 Keswick St., Van Nuys, Calif.

Check 3930 opposite last page.



BUILT & SHIPPED... ON TIME

Today, modern oil refineries and chemical plants require more and more complicated pieces of fabricated equipment—too large to ship by rail or road. To meet this need, Sun Ship specializes in building and shipping large carbon or alloy steel units by water (inland, coastal or overseas)...directly from our plant.

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**There's only one UNIBESTOS . . .
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No breakage in shipment or handling . . . goes on quicker . . .
cuts and fits easily . . . take it off and put it back on as
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For more information on product at left, specify 3932 see information request blank opposite last page.



Industrial water importance to our national well-being is discussed in 26-page publication of lecture presented at 1957 Annual Meeting of American Society for Testing Materials. To obtain "Your Most Important Raw Material", remit \$1.25 direct to American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa.

Filters that provide microclarity for all types of industrial fluids, compressed air, CO₂, and other gases are covered in company catalog that also describes engineering facilities. Filter Cat — Dept. CP, Commercial Filters Corporation, Melrose 76, Mass.

Check 3868 opposite last page.

Storage structure and related material handling equipment are described in eight-page illustrated booklet that provides dimensional and capacity data. In addition, basic information on negative and positive pneumatic systems, rotary valves, bucket elevators, feeders, and other equipment is provided. Bul 207 — Sprout, Waldron & Co., Inc., 130 Logan St., Muncy, Pennsylvania.

Check 3933 opposite last page.

Photometry attachments — are described in six-page brochure. Accessories for flame photometry, diffuse reflectance, paper strip chromatography and test tube analyses plus application information are described. Bul 737 — Scientific and Process Instruments Div., Beckman Instruments, Inc., 2500 Fullerton Road, Fullerton, California.

Check 3934 opposite last page.

Vinyl-acrylic emulsion, supplementing present line of polyvinyl acetate emulsions, is discussed in four-page bulletin which points out that compound's very fine particle size readily lends itself as a vehicle for water-based paints. Bul NP-30 — Plastics Div., Celanese Corporation of America, 744 Broad St., Newark 2, N. J.

Check 3935 opposite last page.

Mixing and process equipment is detailed in 12-page bulletin that describes and illustrates various units. Dimensions and specifications of mixers and chemical blenders are provided. Bul 83 — International Engineering, Inc., 1200 Bolander Ave., Dayton 1, Ohio.

Check 3936 opposite last page.

Corrosion-resistant valves of cast Monel and nickel have respective areas of application described in Bul 9 — Alloy Steel Products Co., Inc., Linden, N. J.

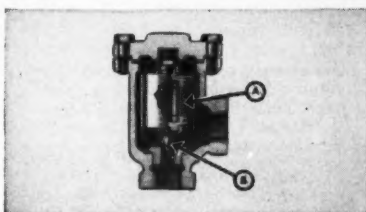
Check 3937 opposite last page.

Full-range steam traps cut high cost of steam pressure variations

By John W. Ritter, Test Engineer
SARCO Company, Inc.

While boiler room economics dictate that boiler pressures remain constant, the equally sound economics of batch processing may decree that pressures at the equipment vary with the requirement of the process. The attempt to choose a steam trap that is all things to all conditions may result in installing traps that operate inefficiently at either extreme of their pressure range or that require adjustment every time the operations sheet calls for another pressure-temperature setting. Orifice traps represent a somewhat more rational approach to the problem, but often at the price of a continuous discharge of steam, particularly at the low pressures of start-up and shut down. Compromise, adjustment, and steam waste all spell inefficiency in the utilization of steam.

Production-Planned steam trapping, on the other hand, improves efficiency by the use of properly designed and installed thermostatic steam traps. Such traps employ the expansion and contraction of a thermostatic element to operate the discharge valve.

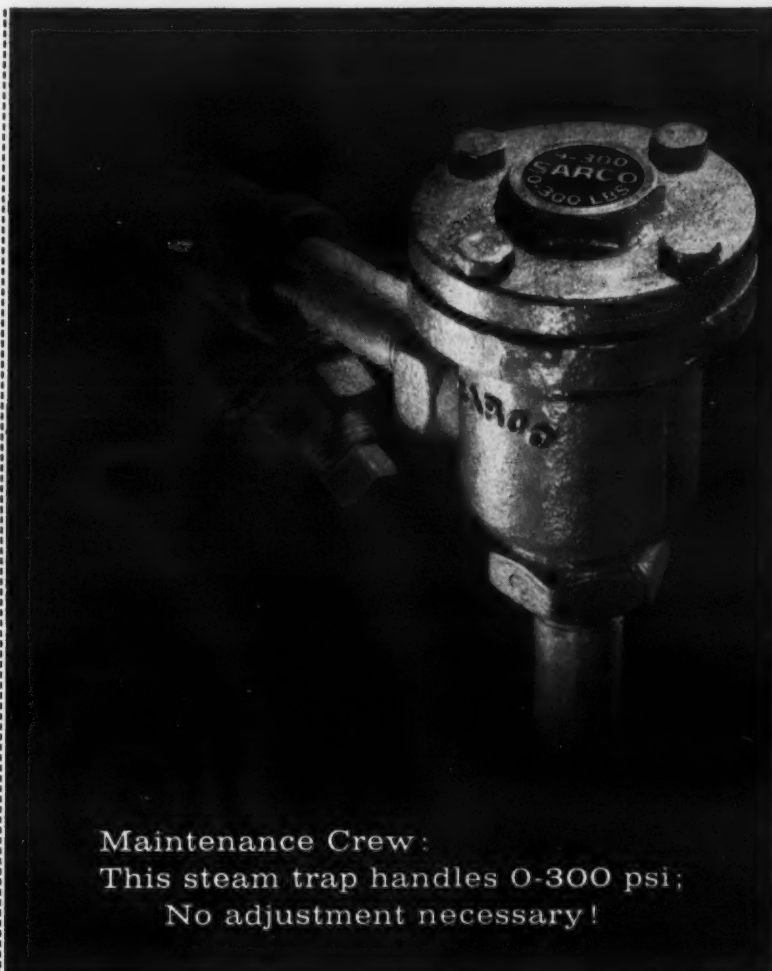


In Sarco Thermostatic Steam Trap, element (A) expands at steam temperature to close valve (B), contracts to permit discharge of condensate.

In the Sarco "Balanced Pressure" Thermostatic Steam Trap a volatile fluid is sealed inside a metal bellows that opens or closes the valve as it contracts or expands with condensate temperature. Near steam temperature, evaporation of the fluid creates an internal pressure greater than steam pressure in the trap body, and the expanding bellows seats the valve. When the condensate cools, the element contracts and opens the valve.

It is evident that at steam temperature pressure inside the element is higher than steam pressure, no matter how the latter may vary. Thus, the trap compensates automatically for variations in pressure.

58108



Maintenance Crew:
This steam trap handles 0-300 psi;
No adjustment necessary!

Sarco "Balanced Pressure" Thermostatic Steam Traps cut trap maintenance costs and simplify parts inventory. Why? Because the same bellows, head and seat handle steam pressures up to 300 psi — without any need of adjustment for variations in load or pressure.

Other advantages: unmatched capacity/cost ratio (1" size discharges 9,650 lbs/hr. at 10°F below steam temperature, 125 psi). This trap can't air-bind and, when installed with free discharge, can't freeze.

Long life and reliable performance are assured by an exclusive Sarco process for fabricating the one moving part — the thermostat — and by steam-testing of every single trap at maximum rated pressure.

Write for "Literature Kit 1A" today. And remember, Sarco can give you impartial advice on *Production-Planned* steam trapping because . . .

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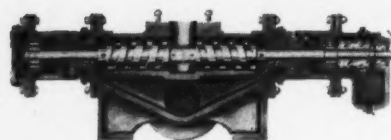
Sier-Bath SCREW PUMPS

handling heavy wax-rubber material
in coating and laminating work at
MARATHON, a Division of American Can Company

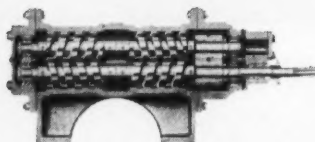
Over 3 years' reliable service, operating
24 hours a day, 5 days a week.

At the Marathon Corporation, Menasha, Wisconsin, four external gear and bearing type Sier-Bath Screw Pumps move heavy Parafilm material from storage cones to coating machines. Each pump has a capacity of 10 gpm. at 200°F., discharging at 50 psig. Float valves in coating machines actuate pumps approximately every 15 seconds round the clock to maintain constant level. Excellent service, with low maintenance, is reported.

Sier-Bath SCREW PUMPS



External Gear and Bearing Bracket Type for non-lubricating liquids and semi-liquids



Internal Gear and Bearing Type for lubricating liquids and semi-liquids

Sier-Bath Screw Pumps maintain high volumetric efficiency because "Dual-Controlled" precision rotor design prevents rotor-to-rotor or rotor-to-casing contact—provides a continuous flow without pulsation, hammering or vibration . . . without strains, misalignment and wear on rotors, shafts, bearings and gears.

Result: Dependable, uninterrupted pumping service—less maintenance—easier servicing—longer pump life—lower overall pumping costs.

Capacities from 1 to 2,000 gpm.; viscosities from 32 SSU to 1,000,000 SSU; discharge to 1,000 psi. for viscous liquids, 200 psi. for water and light oils. Horizontal or vertical construction. Corrosion resistant alloys, special bodies, stuffing boxes and bearings for special needs. See "Yellow Pages" for your Sier-Bath representative or write Sier-Bath Gear & Pump Co., Inc., 9260 Hudson Blvd., North Bergen, N. J.

Sier-Bath ROTARY PUMPS



Screw Pumps



Georex® Pumps



Hydrex® Pumps

Founded 1905

Mfrs. of Precision Gears, Rotary Pumps, Flexible Gear Couplings

Member A. G. M. A.

Check 3939 opposite last page

NEW LITERATURE

Silicone antifoams for use in industry are discussed in brochure. Physical and chemical properties and applications are also found in "Hodag Silicone Antifoams" — Hodag Chemical Corp., 7247 N. Central Park, Chicago 45, Ill.

Check 3940 opposite last page.

Electronic tractor, that does not need operator is discussed in four-page bulletin which describes how it works and lists several economical features. Various applications of equipment are illustrated in Bul 586 — Barrett-Cravens Co., 628 Dundee Rd., Northbrook, Ill.

Check 3941 opposite last page.

Inert gas generator that is compact in size and said to be highly efficient and very economical is described and illustrated in Bul 114 — Thermal Research & Engineering Corp., Conshohocken, Pennsylvania.

Check 3540 opposite last page.

Ultra-centrifuges — 12-page brochure gives notes on applications, field services available, features, and operating characteristics. SBL-2 — Beckman/Spinco Division, Stanford Industrial Park, Palo Alto, Calif.

Check 3942 opposite last page.

Consistency control of fibrous and pulpy slurries is described in four-page Tech Bul 16P1359—Fischer & Porter Co., 832 Jacksonville Rd., Hatboro, Pa.

Check 3943 opposite last page.

Cooling coil selection information, as well as detailed descriptive information on the coils themselves, is included in 52-page bulletin. Specifications, dimensional data, surface charts, circuiting diagrams, and 24 pages of capacity rating tables are provided in Bul 880 — American Air Filter Company, Inc., 215 Central Ave., Louisville 8, Kentucky.

Check 3944 opposite last page.

Ball mill reported to give high grinding efficiency and have low ball and lining wear is subject of bulletin that provides specifications and other pertinent information. Bul AH-414 — Hardinge Company, Incorporated, 240 Arch St., York, Pa.

Check 3888 opposite last page.

Polystyrene technical reports are cataloged in publication that lists results of research conducted for Army, Navy, and Air Force and other government agencies, and German documents captured by the Allies during World War II. To obtain CTR-346 Polystyrene, remit 10c direct to Office of Technical Services, U.S. Department of Commerce, Washington 25, D. C.

Fact file is a compact reference folder which contains technical bulletins describing types of contact cements, their properties, recommended bonding techniques, and handling. Instant-Lok Fact Files — Structural Products Div., National Starch Products Inc., 750 Third Ave., New York, N. Y.

Check 3945 opposite last page.



"It's not the salt mines, it's being sent up in a sputnik that worries me."

NO DANGER EVEN IF DIAPHRAGM FAILS

YOU ARE SAFE
with **ROCKWELL**
"D-D" VALVES

When the diaphragm of a conventional diaphragm valve fails, there's leakage, loss, contamination, trouble. With the "D-D" valve this can't happen! If the diaphragm breaks, the disc still provides complete shut-off.

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SUPER/AIR-VAN®

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Check 3947 opposite last page



AMCA Seal does not apply to units with wheels of less than 12" diameter.

NEW LITERATURE

Manometers for measuring pressure and vacuum are illustrated and specified in 24-page catalog. Section assists in determining best combination of manometer type, range, scale, indicating liquid, mounting and accessories for specific applications. Cat 2008—King Engineering Corp., Box 680, Ann Arbor, Mich.

Check 3948 opposite last page.

Liquid ion exchanger tech notes are presented in 17-page booklet. Nature and properties of liquid amine anion exchange resin are discussed, followed by details in handling and operational steps in using this product. Amberlite LA-1 Tech Notes — Resinous Products Division, Rohm & Haas Company, Washington Square, Philadelphia 5, Pennsylvania.

Check 3949 opposite last page.

Instantaneous sensing and transmitting units including transmitters, valve positioner, and AC or DC recorders and controllers are detailed in company bulletin. Electronic instruments bul — Taylor Instruments Companies, Rochester, N. Y.

Check 3679 opposite last page.

Welding symbol changes are incorporated in standard containing many additions and improvements. Chart of symbols has been redesigned to include new developments. "Standard Welding Symbols" is \$3. Wall-size Chart of Welding Symbols is \$1.50; desk-size 50c. All may be obtained from Department T, American Welding Society, 33 West 39th St., New York 18, N. Y.

Fork-lift trucks, 3000 to 10,000 lbs capacities, are subject of four-page bulletin that illustrates and briefly describes features of truck construction. BW BU-481 — Engine Material Handling Div., Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.

Check 3950 opposite last page.

Asbestos filter sheets, and full line of filters and pumps are described and illustrated with photographs and schematic diagrams in 20-page catalog. Also described are bottle fillers and mixers. Cat 58 — Ertel Engineering Corporation, 20 Front St., Kingston, N. Y.

Check 3951 opposite last page.

Tubing selection and application is covered in 12-page booklet. Form and characteristics of 63 standard and 26 special materials cold-drawn into small tubing are included. Bul 41 — Superior Tube Company, 1512 Germantown Ave., Norristown, Pa.

Check 3952 opposite last page.

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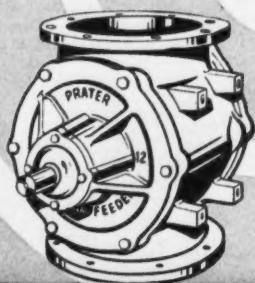
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Check 3953 opposite last page

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Check 3954 opposite last page

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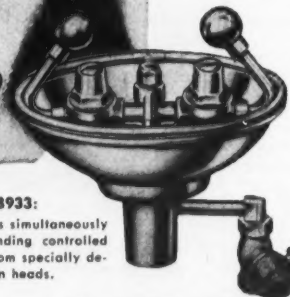
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Model 8933:

Face spray ring acts simultaneously with eye-wash, sending controlled streams of water from specially designed twin fountain heads.



HAWS

Check 3955 opposite last page

NEW LITERATURE

Nitroparaffins and their uses in coatings are described in 14-page technical bulletin amply illustrated with charts, graphs, and tables. TB-No. 11 — Commercial Solvents Corporation, 260 Madison Ave., New York 16, N. Y. Check 3956 opposite last page.

Noncatalytic afterburners for automobiles as a means of reducing atmospheric pollutants are discussed in 38-page report illustrated with charts, tables, graphs and equations. Report No. 25 "Combustibility of Simulated Automobile Exhaust Gases" — remit \$1.50 to Air Pollution Foundation, 2556 Mission St., San Marino, Calif.

Vibratory feeders, electromagnetic, are covered in 30-page illustrated catalog on equipment for hard-to-handle bulk materials. Data and specifications for line of 13 standard electromagnetic feeders, plus other types, are included. Vibrating feeders bul — Syntrol Co., 110 Lexington Ave., Homer City, Pennsylvania.

Check 3957 opposite last page.

Filter presses, vertical leaf filters, filter media, and horizontal plate filters are detailed in company literature that also describes services. Filter literature — T. Shriver & Company, Inc., 846 Hamilton St., Harrison, N. J.

Check 4034 opposite last page.

Synchronous motors and controls are described in well illustrated 27-page booklet. Contained in brochure are motor selector charts, application data, and formulas for calculating power factor. Booklet B-7292 — Westinghouse Electric Corporation, Box 2099, Pittsburgh 30, Pa.

Check 3958 opposite last page.

Chemical processing equipment and services are described in six-page, two-color bulletin. A highlight is a section on what latest methods of chemical processing can mean to industry. Bul WC-120 — Graver Water Conditioning Co., Div. of Union Tank Car Company, 216 West 14th St., New York 11, N. Y.

Check 3959 opposite last page.

Ion exchange method of water conditioning is explained in 60-page pocket-size handbook. Softening, dealkalizing, and demineralizing processes are discussed from standpoint of equipment and chemicals required and quality of water produced. Bul Z-5 — Ion Exchange Div., National Aluminate Corporation, 6294 W. 66th Place, Chicago 38, Ill.

Check 3960 opposite last page.

Surface active agent, (3,5-dimethyl-1-hexyn-3-ol) is volatile, non-foaming (non-ionic) compound described in four-page bulletin. Included are applications, physical properties, comparative evaporation rates and synergistic wetting power. Bul S-4 — Air Reduction Chemical Company, Div. of Air Reduction Company, Incorporated, 150 East 42nd St., New York 17, N. Y.

Check 3961 opposite last page.

Electric industrial truck of 4000-lb capacity is shown in operation in four-page folder. Basic construction features, turning diagrams, and dimensional design data are provided. Model F-45T4 Bul — Elwell-Parker Electric Company, 4205 St. Clair Ave., Cleveland 3, Ohio.

Check 3962 opposite last page.

Analytical balance — of single pan design is described in four-page bul. Procedure of substitution weighing is described and advantages given. Bul 56 — William Ainsworth & Sons, Inc., 2151 Lawrence St., Denver 5, Colorado.

Check 3963 opposite last page.

Rotameters — for laboratory use are described in two-page bul. Rotameters are applicable to both liquids and gases. Connections can be of plastic, glass, or metal piping. Bul 18L — Schutte & Koerting Co., Cornwells Heights, Bucks Co., Pa.

Check 3964 opposite last page.

Pneumatic system for transferring ground products from attrition mills is detailed in bulletin that contains diagrammatic sketch showing relationship between equipment and attrition mill, as well as detailed table of specifications. Bul 158-A — Sprout, Waldron & Co., Inc., 130 Logan St., Muncy, Pennsylvania.

Check 3965 opposite last page.

Dimethyl ethers are discussed in 24-page catalog which explains physical and chemical properties and uses. Bibliography lists 44 references. "Chemical Products Bulletin" — Chemical Products Dept., Ansul Chemical Company, Marinette, Wis.

Check 3966 opposite last page.

"Electronic ear" to regulate feed rate to grinding mills is described in four-page bulletin which discusses how device is based upon grinding sound from mill. Bul AH-480 — Hardinge Company, Incorporated, 240 Arch St., York, Pennsylvania.

Check 3967 opposite last page.

NEW LITERATURE

Variable speed drives, $\frac{1}{2}$ to 25 hp, chain-driven, are described and illustrated in company literature that shows construction and points out features. Book 2274 — Link-Belt Company, Prudential Plaza, Chicago 1, Ill.

Check 3591 opposite last page.

Process instruments — available for quick shipment — are covered in 52-page catalog. These include indicators, transmitters, recorders and controllers for flow, pressure, temperature, density, viscosity and consistency. Cat 2 — Fischer & Porter Co., 941 Jacksonville Rd., Hatboro, Pa.

Check 3968 opposite last page.

Selective analyzer — for process control is described in four-page bul. Instrument operates by analyzing gases according to thermal properties. Principle of operation is given. Bul No. 0716-2 — Mine Safety Appliances Co., 201 N. Braddock Ave., Pittsburgh 8, Pennsylvania.

Check 3969 opposite last page.

Rotary pumping hydraulic equipment data is contained in 28-page bulletin. Factors involved in pump selection are outlined, and commonly used hydraulic terms are defined. Bul 33 — Blackmer Pump Company, Grand Rapids, Mich.

Check 3970 opposite last page.

Dust control problems and how they are solved are described in unusual loose-leaf bulletin which uses variety of photographs to illustrate solutions. Containing 15 pages, bulletin also includes selection, pricing, and accessory information. Bul 82 — The Flex-aust Company, Div. of Callahan Zinc-Lead Company, Inc., 100 Park Ave., New York 17, N.Y.

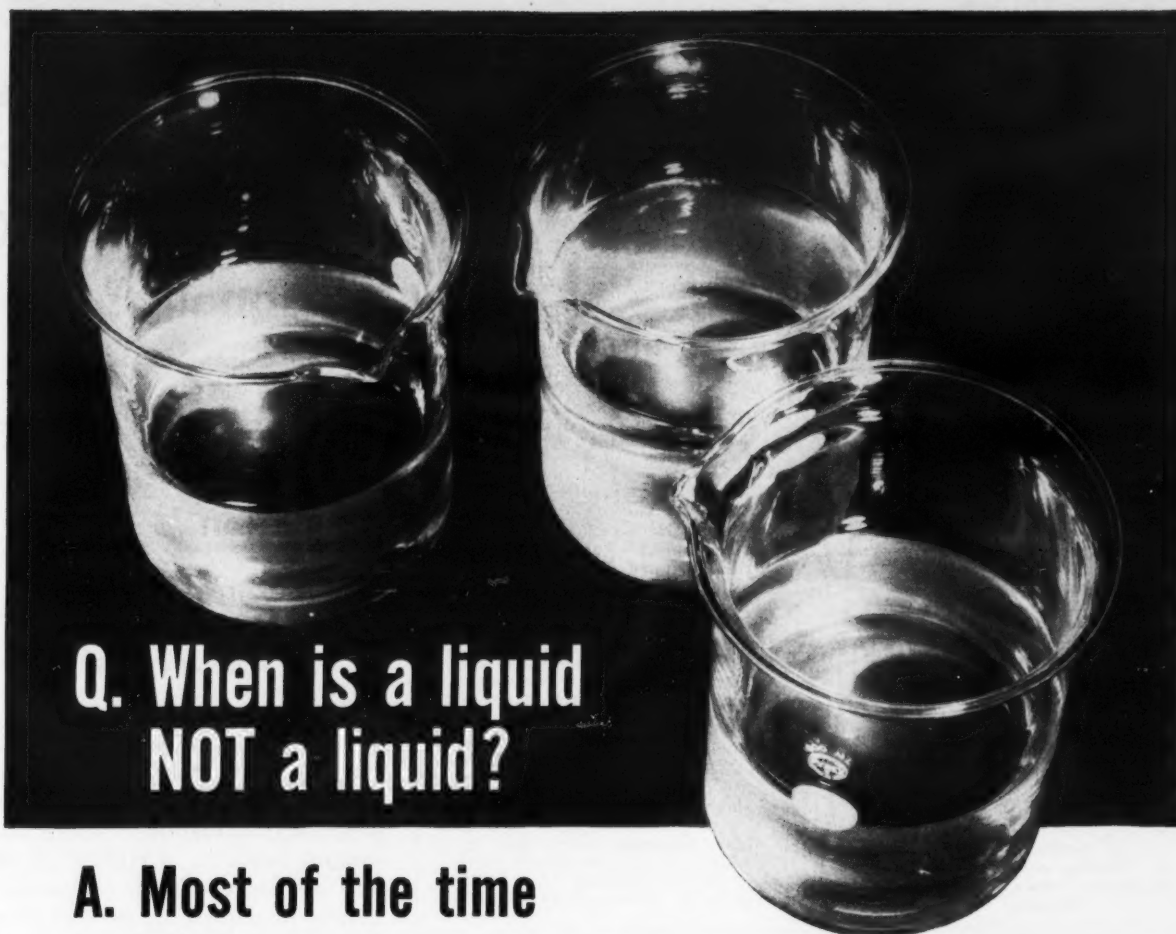
Check 3971 opposite last page.

Scale for bulk weighing of dry and free-flowing as well as sluggish materials is described in product data sheet. Operation of scale is thoroughly described, and specifications listed. Product Data Sheet 5807 — Richardson Scale Co., Clifton, N.J.

Check 3972 opposite last page.

Caustic soda is discussed in 26-page handbook, profusely illustrated, which includes basic information on various commercial forms of product and shipping containers. Major feature is set of tabulations and conversion charts which provide data on solutions. "Handbook on Caustic Soda" — Stauffer Chemical Company, 380 Madison Ave., New York 17, New York.

Check 3973 opposite last page.



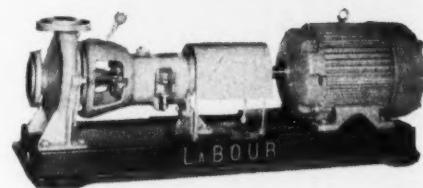
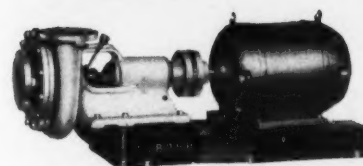
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A. Most of the time

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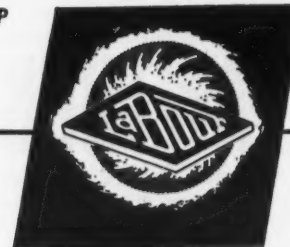
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Check 3974 opposite last page

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Check 3981 opposite last page

NEW LITERATURE

Lift truck versatility is featured in four-page bulletin which shows how easily truck can be converted from fork lift to drum handler, platform carrier, utility scraper, or 10- or 15-cu-ft-capacity hopper carrier. "Moto-Bug" bul — Kwik-Mix Company, Div. of Koehring Company, Port Washington, Wis. Check 3976 opposite last page.

Hammermills which feature crusher-feeder and permanent magnetic separator are described in two-page catalog sheet. Bul CH-M 581 — The Prater Pulverizer Company, 1515 South 55th Ct., Cicero 50, Ill.

Check 3977 opposite last page.

Control valves — are described in well illustrated 12-page booklet which gives details on construction and operating characteristics. Valve is combination of single-seated valve body and cylinder actuator. Optional accessories are illustrated. Bul LB-3 — Conoflow Corporation, 2100 Arch St., Philadelphia 3, Pa.

Check 3978 opposite last page.

Laboratory appliances are reviewed in 1040-page catalog. Many reference tables are included. For copy of Cat 59, write to Fisher Scientific Co., 717 Forbes St., Pittsburgh 19, Pa.

Storage rack system catalog features adjustable combination pallet, skid, and die rack. This rack can also be used as live-feeder type rack, drive-in rack, or as order-picking frame. Other racks and tiering frames are covered, too. Cat 58B — The Paltier Corp., 1701 Kentucky St., Michigan City, Indiana.

Check 3979 opposite last page.

Carbon and graphite properties and uses are described in 56-page manual so complete it even shows how products are made. Detailed application information for a number of mechanical, chemical, electrical, and refractory uses are described and illustrated. Cat 40B — Stackpole Carbon Company, St. Marys, Pa.

Check 3980 opposite last page.

Air pollution report of 212 pages is devoted to secondary atmospheric reactions of compounds such as those which occur in auto exhaust. Using as criteria the known rates of reaction, the report summarizes important reactions and eliminates from consideration those of little importance. To obtain "Photochemical Secondary Reactions in Urban Air", remit \$6.00 direct to Air Pollution Foundation, 2556 Mission St., San Marino, Calif.

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NEW LITERATURE

Indicating flowmeter, featuring vitreous enamel lined end fittings and designed for corrosive service, is described in four-page specification sheet. Spec Sheet 10A1710—Fischer & Porter Company, 785 Jacksonville Rd., Hatboro, Pennsylvania.

Check 3982 opposite last page.

Fatty organic chemicals are described in 8-page booklet. Over 150 products, including some heretofore unavailable, are listed. "Aliphatic Organic Chemicals"—Armour & Co. Chemical Div., 1355 West 31st Street, Chicago 9, Illinois.

Check 3983 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

Adjustable pump operating data are contained in eight-page bulletin which details handling liquids or hygroscopic solids in suspension under variable capacity and head requirements. Bul 08B-9050—Allis-Chalmers Manufacturing Company, Milwaukee 1, Wisconsin.

Check 3984 opposite last page.

Electric tiering truck, rider-type, for narrow aisles is described in six-page circular. Operating and maintenance details on either 2000- or 3000-lb model containing 24-volt electrical system are presented. Circular 35K—Dept. R8-22, Lewis-Shepard Products, Inc., 125 Walnut St., Watertown 72, Mass.

Check 3985 opposite last page.

Heat-transfer fluid designed specifically for snow-melting installations is detailed in company booklet. Information on typical installations and a short history of the development and use of snow-melting systems are included in 20-page manual. Dowtherm SR-1 booklet—Organic Chemicals Sales, The Dow Chemical Company, Midland, Mich.

Check 3986 opposite last page.

Power and gravity conveyors are illustrated and described in six-page bulletin which explains "assemble-yourself" construction, outlines details of engineering service, and includes sketch of typical two-floor conveyor system. Bul CL 858—Conveyor Specialty Co. Inc., 33 Newport Ave., North Quincy 71, Mass.

Check 3987 opposite last page.

Glassed-steel reactors are described in eight-page bulletin that includes capacities, weights, and dimensions, as well as detailed information on standard and optional components. Schematic drawings for each design size show nozzle, piping, and drain locations. Bul 927—The Pfaudler Co., Division of Pfaudler Permutit Inc., 1074 West Ave., Rochester, N. Y.

Check 3988 opposite last page.

Recording controllers—plus records and indicators are covered in 12-page bul on single-point and multi-point strip-chart recorders and recording controllers. Features, application data, and specifications are given. Bul GEA-6792—General Electric Company, Schenectady 5, N.Y.

Check 3989 opposite last page.

Plastic laboratory ware, from beakers to vacuum drums, is illustrated and indexed in 16-page catalog. All popular plastics are represented, and tables outline their properties, indicating best for specified conditions. Cat P58—Will Corp., Rochester 3, N.Y.

Check 3990 opposite last page.

Tubeaxial fans are described in seven-page catalog which charts recommended stack sizes, maximum horsepower, and maximum motor speed for variable stack velocity and air flow output. Cat 1110-B—Sturtevant Div., Westinghouse Electric Corporation, Hyde Park, Boston 36, Mass.

Check 3991 opposite last page.

Thiodiglycol useful in dye and lubricant industries is discussed in revised bulletin. Properties, test methods, and storage data are cited. "Kromfax Solvent"—Union Carbide Chemicals Co., Union Carbide Corp., 30 East 42nd St., New York 17, N.Y.

Check 3992 opposite last page.

Safety equipment users will find invaluable helps in 48-page catalog which serves as a guide to selecting, applying, and maintaining protective equipment for industrial applications. To obtain catalog, write to Chicago Eye Shield Company, 2719 W. Roscoe St., Chicago 18, Ill.

Check 3993 opposite last page.

Laboratory equipment is discussed in 1273-page catalog. Includes centrally located, integrated index and newly developed numbering system. Requests for Cat 400 should be made on company letterhead to Chemical Rubber Co., 2310 Superior Ave., Cleveland 14, Ohio.

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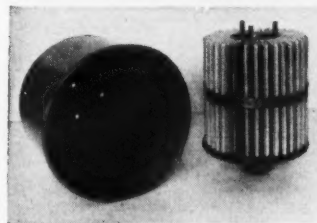
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Check 3997 opposite last page

NEW LITERATURE

Hygienic guides covering 62 sub-
 jects from acetaldehyde to zinc
 oxide are now available. Each
 guide covers a single chemical
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 allowable concentrations, and en-
 gineering and medical control
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 ences. Guides are 25c each (one
 subject to sheet.) Free list of hy-
 gienic guides may be obtained
 from American Industrial Hygiene
 Association, 14125 Prevost, De-
 troit, Mich.

Check 3998 opposite last page.

Thermometers — and hydrome-
 ters for laboratory use are de-
 scribed in catalog which contains
 specifications and prices of over
 one thousand instruments. Of 18
 pages, catalog also contains tem-
 perature conversion table. Cat 586
 — Brooklyn Thermometer Co.,
 217-09 Merrick Blvd., Springfield
 Gardens, 13, New York, N. Y.

Check 3999 opposite last page.

Conveyor belt which is said to re-
 quire no breaker fabric is detailed
 in 12-page brochure. Drawings are
 effectively used in describing com-
 pensation and other features of
 belt. Pages are arranged to repre-
 sent an actual cross-section. Bul
 M302 — Manhattan Rubber Div.,
 Raybestos-Manhattan, Inc., Pas-
 saic, N. J.

Check 4000 opposite last page.

Packaging conveyors — Survey
 was made to determine degree of
 standardization that exists in pack-
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 from The Packaging Institute,
 Inc., 342 Madison Ave., New
 York 17, N. Y.

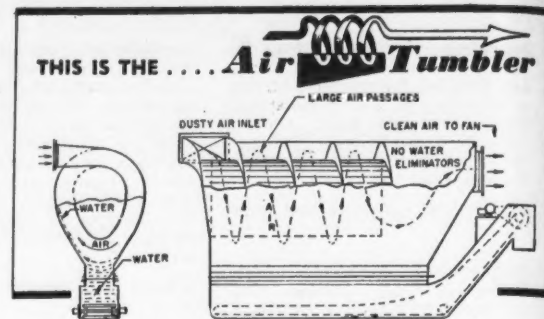
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 channel pulse-height analyzer,
 non-overloading linear amplifier,
 and milli-microsecond time-meas-
 uring system. "Short Form Cata-
 log"—Eldorado Electronics, 2821
 Tenth St., Berkeley, Calif.

Check 4001 opposite last page.

British trade and technical pub-
 lications, numbering more than
 300, are described in recently
 published booklet. It is illustrated
 with pictures of front cover of
 each journal. "Business and Spe-
 cialized Publications of Great
 Britain" — British Information
 Services, 45 Rockefeller Plaza,
 New York 20, N. Y.

Check 4002 opposite last page.

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 CARROLLTON, OHIO
 In Canada: Safety Supply Co., Toronto

Check 4004 opposite last page

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**Button cells
nickel size**

Two new button cells for minimum power requirements have been produced by Gulton Industries, Inc. About the size of a 5c piece, units are said to be among smallest rechargeable sintered-plate nickel cadmium cells available.

Hermetically sealed cells were designed specifically for miniature and subminiature electrical and electronic applications requiring minimum power.

**Glutamine
studies**

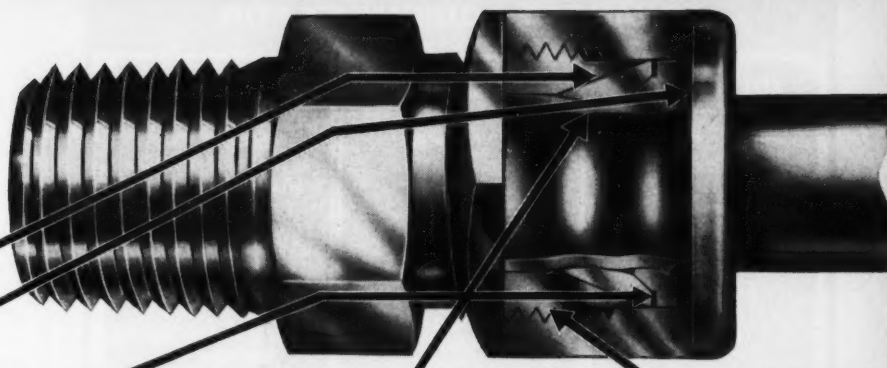
A University of Texas biochemist will make a large scale study of how glutamine improves mentally retarded children. A gift of 25 lb of glutamine from General Mills Research Laboratories will permit continuation of a project halted three years ago.

For more information on product at right, specify 4005 see information request blank opposite last page.



What do you
Swagelok people
have that's so good?

*Here's what
Swagelok has
that's so good!*



1. **LEAKPROOF SEAL.** Patented Swagelok design assures positive leakproof seals at 3 different contact points to hold extreme pressures and vacuums.
2. **VIBRATION-FREE.** Swagelok design enables fitting to firmly grasp tubing with two ferrules and a threaded chuck, assuring practical distribution of contact forces and maintaining vibration-free rigidity.
3. **TORQUE-FREE.** The positive 3-point sealing contacts in the Swagelok tube fitting attain top operating efficiency with only 1½ turns of the tightening unit. Absolutely no torque is transmitted to the tubing in assembly.
4. **CONSTRICTION-FREE.** Because of the scientific distribution of the 3 leakproof contact points in the Swagelok design, there is practically no constriction of the inner tube wall, so that turbulence is negligible on heavy or thin wall tubing.
5. **QUICK ADAPTABILITY.** Swagelok tube fittings come to you completely assembled, finger tight, ready for immediate use. Simply slip the tubing into the Swagelok fitting, give the nut 1½ turns, and the assembly is ready for assured, leakproof service.

In Swagelok tube fittings, there is nothing finer than man's ingenuity and precision machinery can produce.

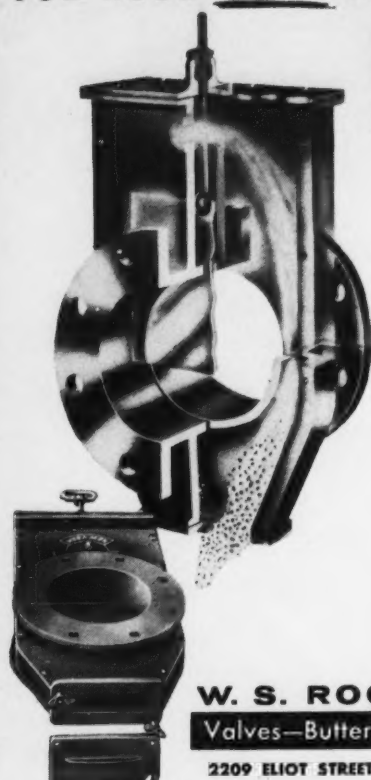
Swagelok is the one name that stands apart from all the others in the field...outstanding and unique in concept, craftsmanship and

leakproof performance in extreme service. Swagelok engineers are equipped with experience, ability, and wide range of tube fitting designs to meet your individual problems. Quick delivery of Swagelok tube fittings from local distributor stocks.

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Crawford Fittings (Canada) Ltd., Stamford, Ontario, Canada

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For fluids, air or gases containing solids or for free flowing granular materials that clog or jam conventional valves—Kwikleen is the answer.

It permits 100 per cent flow in full open position and quick shut-off manually or mechanically. Easily, quickly cleaned by removing bottom plates. The valve need not be removed from the line. Sediment drops out or can be blown or flushed out by air or water.

Ask for Bulletin 501.

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Valves—Butterfly • Slide • Diaphragm • Special

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DISINTEGRATORS
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Crushing
Disintegrating
Cutting
Homogenizing
Delumping
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Fine or Coarse
Wet or Dry
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and Dispersing
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Check 4007 opposite last page

NEW LITERATURE

Processing equipment such as pumps, pneumatic conveyors, fluidizing conveyors, rotary compressors, etc., are covered in 12-page illustrated bulletin. Applications and performance characteristics are discussed, operating principles are explained, and photographs show typical installation. Bul G-3B — Fuller Co., Subsidiary of General American Transportation Corporation, Catasauqua, Pa.

Check 4008 opposite last page.

Products catalog containing 38 pages describes properties and uses of 375 industrial, pharmaceutical, and agricultural chemicals. The 1958-59 issue is available from The Dow Chemical Company, Midland, Mich.

Check 4009 opposite last page.

Gage models, over 250 of them, including pressure, vacuum, compound, and pneumatic and electric transmitter, are specified in 40-page Cat NR-198 — Instruments Div., International Register Co., 2630 W. Washington Blvd., Chibucks County, Pa.

Check 4010 opposite last page.

Compact axial-flow, positive-displacement blower-exhauster is described in bulletin that tells how unit can help increase production. Bul CB-157 — Dept. C-1, Air Appliance Div., U.S. Hoffman Machinery Corporation, 103 Fourth Ave., New York 3, N. Y.

Check 3698 opposite last page.

Chemistry of complex gold and precious metal ores is discussed in 54-page technical publication well illustrated with charts, tables, and graphs. "Chemistry of Cyanidation" — Explosives and Mining Chemicals Dept., American Cyanamid Company, 30 Rockefeller Plaza, New York 20, N. Y.

Check 4011 opposite last page.

Density measurement — of liquids, slurries, or divided solids, without contacting measured material is described in 12-page bul. System is based on absorption of radiation by material using radioactive source. Bul NI-158 — Industrial Nucleonics Corp., 1205 Chesapeake Ave., Columbus 12, Ohio.

Check 4012 opposite last page.

Atomizing nozzles for spraying liquids in quantities up to about 3 gpm are subject of bulletin that includes information on sizes, dimensions, capacities, and materials of construction. Bul 6A-661 — Dept. JA-14, Schutte and Koerting Company, Cornwells Heights,

Check 4013 opposite last page.

Special-purpose alloys for tubing and pipe used especially in missile, rocket, nuclear energy, and chemical fields are described in 12-page bulletin. Bul T. D. 125 — Alloy Tube Division, Carpenter Steel Company, Union, N. J.

Check 4014 opposite last page.

Stencil inks applied with aerosol container, and other products, are described in four-page bulletin. Feature is color chart. Bul-58 — Reynolds Ink, Incorporated, 4500 Euclid Ave., Cleveland 3, Ohio.

Check 4015 opposite last page.

Dynamometers — for use in measurement of tensile, compression, or torque forces, are described and typical applications illustrated in 88-page book. Different fields of application are indexed. Remit 50c on company letterhead. Dillon Dynamometers at Work — W. C. Dillon & Co., Inc., PO Box 3008, Van Nuys, Calif.

Lift truck of 2000-lb capacity is covered in eight-page illustrated bulletin that provides pictorial story about how this 35-hp truck operates. Bul BU 485 — Engine-Material Handling Div., Allis-Chalmers Mfg. Co., Box 512, Milwaukee 1, Wis.

Check 4016 opposite last page.

Single red lead primer for rusted, weathered or new galvanized steel is described in technical letter consisting of three pages. Red Lead Technical Letter No 13 — Lead Industries Association, 60 East 42nd St., New York 17, New York.

Check 4017 opposite last page.



"Why can't you come up with something revolutionary — like a hoola hoop."

NEW LITERATURE

Plating waste treatment systems are discussed in six-page reprint which covers both batch and continuous method for possible use in treatment of hexavalent chromium, cyanides, acids and alkalis. Appropriate flow diagrams and cutaways of treatment units are included. Tech Reprint T-163 — Graver Water Conditioning Co., Div. of Union Tank Car Co., 216 W. 14th St., New York 11, N. Y. Check 4018 opposite last page.

Recording turbidimeter is described in three-page bulletin. Applications, principles of operation, and specifications are listed. Block diagram shows solids-removal operation. Bul GET-2741-9 — General Electric Co., Schenectady 5, New York. Check 4019 opposite last page.

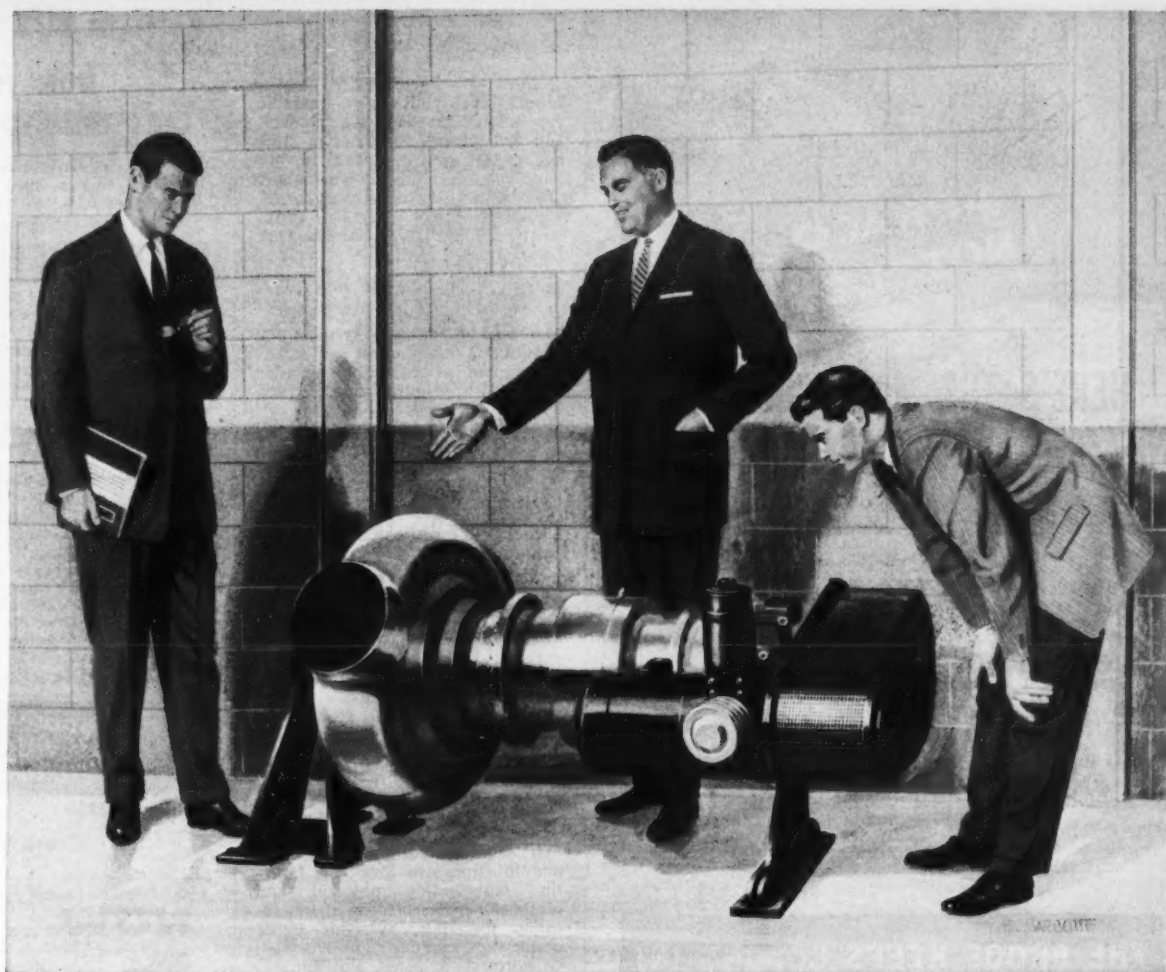
Industrial chemicals are subject of revised 12-page bulletin. Approximately 65 organic and inorganic compounds are included. Bul 100-B — Hooker Chemical Corporation, Niagara Falls, N. Y. Check 4020 opposite last page.

Gas pumps, rotary positive, are covered in six-page revised bulletin. Technical rating data is clearly presented along with detailed design and construction data to aid in proper selection and application of equipment. Bul XA-458—Roots-Connersville Blower, a division of Dresser Industries, Inc., 900 W. Mount St., Connersville, Ind. Check 4021 opposite last page.

Air-conditioning and ventilating-system standards now permit use of duct materials other than metal. Changes in standards are detailed in 24-page booklet. "Air Conditioning and Ventilating Systems of Other Than Residential Type (NFPA No. 90A) may be obtained by remitting 50c to National Fire Protection Association, 60 Battery-march St., Boston 10, Mass.

"Dry fluid" drive, available in drives and couplings in capacities from fractional to 1000 hp, is described in technical bulletin. Dodge Manufacturing Corporation, 6200 Union St., Mishawaka, Ind. Check 3882 opposite last page.

Cyclone separator designs and controls are featured in four-page bulletin which stresses importance of proper apex discharges relating to classification efficiency. Cut-away drawings and apex capacity chart for cyclone users and others with classification problems are included in Bul 1400 — Equipment Engineers Inc., 41 Sutter St., San Francisco 4, Calif. Check 4022 opposite last page.



New 1100 hp Solar gas turbine offers small size, light weight, greater fuel efficiency

SOLAR'S NEW 1100 HP SATURN engine represents an important forward step in gas turbines. Advantages of the new power plant include these: it is extremely lightweight, averaging less than 1/10 the weight of conventional engines; it occupies only about 51 cubic feet; it starts instantly and takes full load without laboring in temperatures from -65F to 130F—even after long periods of standby service. In addition, the new Saturn engine offers an unequalled advance in gas turbine fuel efficiency, and it will operate on a great variety of fuels.

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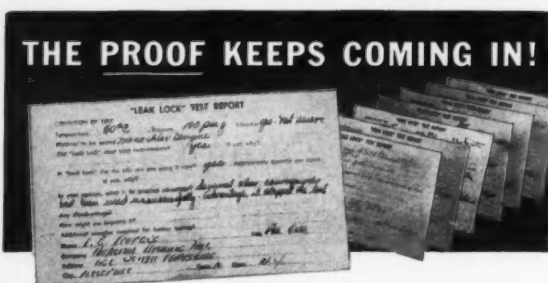
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Use *Leak Lock* to seal thread and flange joints...to keep bolts, nuts and plugs from loosening under the most rigorous usage. It's been job-proved in thousands of applications to give these advantages...

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Check 4025 opposite last page

NEW LITERATURE

Liquid level controls — suitable for water, gasoline, oil, alcohol, and acid in any container or storage vessel are described in 46-page catalog. Units shown include models for hazardous uses. Catalog Level-Master — Jo-Bell Products, Inc., 5456 W. 111th St., Oak Lawn, Ill.

Check 4026 opposite last page.

Manifold distribution systems for continuous distribution of industrial gases are described in 28-page brochure. Production, space and cost benefits of custom-built installations are discussed. Bul N-125 — National Cylinder Gas Div., Chemetron Corporation, 840 N. Michigan Ave., Chicago 11, Illinois.

Check 4027 opposite last page.

Fixed tube bundle heat exchangers (shell-and-tube) which are available in more than 180 standard models are illustrated and described in 16-page catalog. An interesting feature is an oil viscosity chart. Cat No. 1258 — Young Radiator Company, 724 Marquette St., Racine, Wis.

Check 4028 opposite last page.

High-strength materials containing at least 85% aluminum oxide in the corundum form are described and illustrated in four-page bulletin. Outstanding physical and electrical properties of these ceramic materials, available either dense (i.e. vacuum tight, vitrified) or porous, are listed. Bulletin 858 — Coors Porcelain Company, 600 Ninth St., Golden, Colo.

Check 4029 opposite last page.

Gas chromatography — Ten-page data sheet explains how to raise quantitative accuracy by peak area and peak height measurements. Details steps in several typical analyses. Data Sheet GC-86-M1 — Beckman/Scientific & Process Instruments Div., 2500 Fullerton Rd., Fullerton, Calif.

Check 4030 opposite last page.

Rotary air locks for dust collection, pneumatic conveying, and feeding applications are subject of four-page technical bulletin which discusses design features, selection factors, and dimensions and capacities. Bul V-3558 — The Ducon Co., Inc., 147 E. Second St., Minneola, N. Y.

Check 4031 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

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Choice Selection from Our Stock!

Porcelain and Buhrstone Lined Pebble Mills; 37" x 48"; 6' x 6'; 8' x 8'. Stokes R 4 Pre-Form Tablet Press; 5 HP.; Stokes Dual Pressure 294 Mojonnier S/S Cooler; 16 Plates 46" x 60". Pfaudler 6' Gl. Lnd. Evaporators 5,000 Gal. Glass Lined Vacuum Tank; 80" x 21 1/2". Pfaudler Gl. Lnd. Reactors; 1000 gal.

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Bagley & Sewell Double Drum Dryer, 28" x 60". Bufovak Dbl. Drum Dryer, 40" x 120".

Hersey Rotary Gas Fired Counter Current Dryer; 5' x 26' complete accessories.

Stokes Rotary Jacketed Dryer, 18" x 8'.

3 A. O. Smith Stainless Lined Pressure Tanks; 10' x 18 1/2"; 11,000 gal. Mojonnier S/S Vac. Pans; 3' x 10'; 6' x 12'

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both from one
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Now you can do high torque work with a Sturtevant Torque Wrench of normal capacity range—small in size—light in weight—with fine increment markings and moderately priced.

With a new Multi-range, Multi-purpose Adapter you can step up the capacity of your Torque Wrench to a new high range and you can plug in any drive end you want... Box wrench, ratchet, drive square for sockets.

All drive end accessories are interchangeable and stock items.

In this way each Sturtevant Torque Wrench effectively equals two complete sets of ordinary single purpose Torque tools.



Only Torque wrenches with the Sturtevant patented pivoted handle can be accurate with adapters.

write for No. SD-77 catalog sheet



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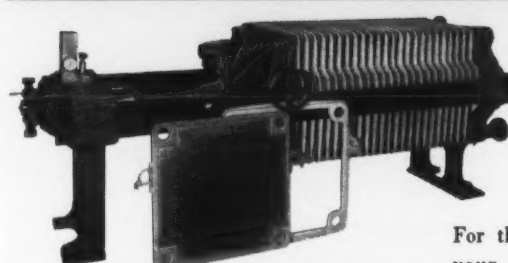
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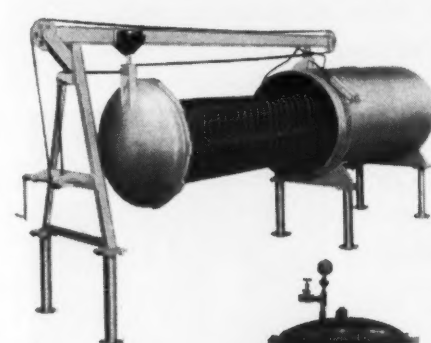
R₂

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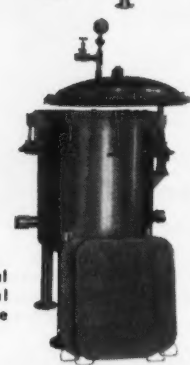
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For the filter that BEST meets your needs you can rely on Shriver. With us it's not what we build but what your process economically calls for that dictates our recommendations.

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LOW SILHOUETTE



LENAPE

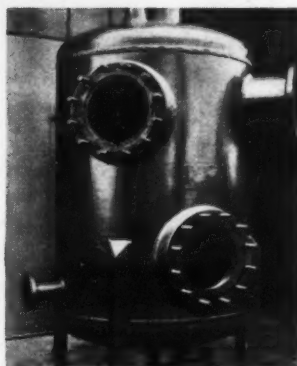
STUDDING OUTLETS

Lenape curved studding outlets or pads are compact in shape and provide inherent reinforcement of the vessel opening. Their low silhouette offers design as well as cost appeal, plus ease and economy of attachment. Use of a supplemental reinforcing ring is completely eliminated.

Important applications include interdeck access openings on small diameter towers or columns, boiler mountings, LPG tanks, clean-out or observation ports and similar uses in close-clearance locations.

Available in standard ID sizes from 1½" to 24" for ASA rated pressure service from 150 lbs. to 2500 lbs.

For detailed specifications, see pages 36-39 of Lenape Catalog 10-53, available upon request.



Compare the low silhouette of Lenape studding outlets with conventional long welding necks on this solvent trap.

See our standard line of pressure vessel connections on pages 1128-1129 in the 1958 Chemical Engineering Catalog.

LENAPE PRESSURE VESSEL CONNECTIONS

LENAPE HYDRAULIC PRESSING & FORGING CO.
DEPT. 100 WEST CHESTER, PA.

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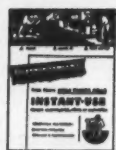
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on projects and products

Warning device triple sensitive

After five years of research, Minneapolis-Honeywell Regulator Company has developed a fire-explosion warning device that signals fire, smoke, and vapors. It is claimed to be the first device sensitive to all three indications of trouble. The cathode tube, about the size of an index finger, operates by adding up impulses of electricity generated as it detects and counts ultraviolet rays emitted by its environment. (*Industrial Research Newsletter*, Armour Research Foundation of Illinois Institute of Technology)

What are kids doing in the office?

Lloyd's of London ran a survey to determine what actually happens to paper clips purchased by British firms. The result: dropped on floor, left in drawers, and swallowed by children, 24.6%; stakes for card games, 19.4%; twisted and broken during telephone conversations, 14.2%; make-shift hooks on women's garters and brassieres, 7.2%; toothpicks and ear scratchers, 5.4%; nail cleaners, 5.3%; pipe cleaners, 3.9%; paper clips, 20%. (*Kaiser Builder*, Henry J. Kaiser Company)

LA smog research making headway

The Air Pollution Foundation says that two more years of research work should produce enough essential facts to enable private industry to build workable, economic, auto-exhaust controls helping greatly to eliminate the smog problem. According to Foundation research so far, formation of ozone (basic LA smog ingredient) from auto exhaust is not affected by amount of olefins in gasoline. (*Industrial Research Newsletter*, Armour Research Foundation of Illinois Institute of Technology)

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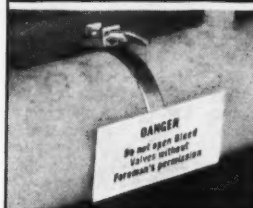
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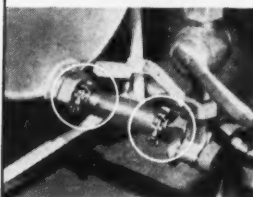
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THAT'S INTERESTING

Laminated wood quick process

Weatherproof, laminated wood beams are turned out in seven minutes by fast laminating process developed by Institute of Technology, Washington State College. Formerly, process took four to 24 hrs. New process uses straight phenolic resin and pre-heat laminating press. Manpower needs are cut down from 13 workers to 3. (*Industrial Research Newsletter*, Armour Research Foundation of Illinois Institute of Technology)

Phillip Wylie take note

Dr. Harry F. Harlow of Wisconsin University's primate laboratory has created a "mother machine" which not only provides monkeys with "breast fed" milk but is constructed of foam rubber for softness, terry cloth wrapped for cuddliness, provided with an internal electric lamp for warmth, and with a spherical wooden head equipped with a seemingly watchful eye. Harlow and his colleagues report that the baby monkey has affectionately accepted the mother-machine. By using this device, the scientists hope to study and understand better the complexities of human love as well as the effect of parental emotions upon the psychological make-up of the offspring. (*Poro-Scope*, Pall Corporation)

Mark Twain hear this

A majority of weathermen belonging to the American Meteorological Society think that weather control or modification may be possible within 10 to 15 years. The control would probably be in the form of increased or decreased precipitation and prevention of hail and lightning. (*Industrial Research Newsletter*, Armour Research Foundation of Illinois Institute of Technology)



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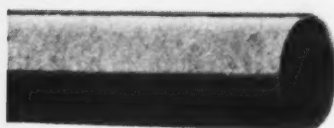
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☐ Sample of Hydroxylammonium Sulfate
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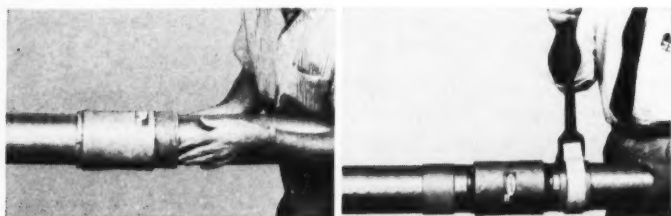
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